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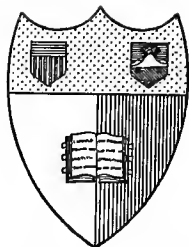
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THE HYGIENE
OF
ARMIES IN THE FIELD

BY
SIR ROBERT RAWLINSON, C.B.

CIVIL ENGINEER, CHIEF EXAMINER, INSPECTOR OF CITIES, GOVERNMENT BOARD.
MEMBER OF THE ARMY SANITARY COMMITTEE.

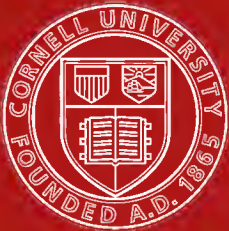


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THE HYGIENE OF ARMIES IN THE FIELD.

THIS subject is so vast, special, and complicated, that I can only promise to touch the fringe of it, and this in a roundabout sort of way. I will not presume to lay down hard and fast rules by which armies in the field may be regulated in sanitary matters in the future, but rather describe, in narrative form, some of my own experience, gained during the time I acted as the Engineer member of the Sanitary Commission sent out to the Army in the Crimea in the spring of 1855; and, that it may be clearly understood under what conditions that Commission was sent out, I insert the Instructions.

*The Instructions to the Sanitary Commissioners on
leaving England for the Crimea :—*

“WAR DEPARTMENT, 19th February, 1855.

“GENTLEMEN,

“Her Majesty having been pleased to assent to your proceeding on a sanitary mission to Constantinople and the Crimea, you are instructed to obey the directions which follow.

“The utmost expedition must be used in starting on your journey, in the journey itself, and in the execution of all that is necessary at the place of your destination.

“On your arrival at Constantinople and Balaklava, you will put yourselves instantly into communication with Lord W. Paulet, Admiral the Hon. F. Grey, and Lord Raglan respectively, and you will request of them forthwith (according to the official directions they will have received) full powers of entry into every hospital, infirmary, or receptacle of whatsoever kind for the sick and wounded, whether ashore or afloat.

“You will inspect every part of such infirmaries, ascertain the character and sufficiency of the drainage and ventilation, the quantity and quality of the water supply, and determine whether the condition of the whole is such as to allow, by purity of the air and freedom from overcrowding, fair play and full scope to medical and surgical treatment for the recovery of health.

“You will call to your aid for this purpose, whether as witnesses or as guides, any of the officers or attendants that you may require.

“The result of your inspection and opinions, together with a statement of all that is necessary should be done, whether in the way of arrangement, of reduction of numbers in the wards, cleansing, disinfecting, or of actual construction, in order to secure the great ends of safety and health, must be laid, as speedily as possible, before Lord W. Paulet, Admiral Grey, or Lord Raglan, as the case may be, or such persons as may be appointed by them to that special duty, and you will request them to give immediate directions that the works be completed.

“As no time is to be lost, you may reserve your detailed and minute reports, and give, in the first instance, a statement only of the things to be done forthwith.

“The Engineer Commissioner will be expected to conduct the inspection along with his colleagues, and to

devise, and to see executed, all such structural arrangements as may be declared indispensable.

“You will examine the modes whereby the sick and wounded are conveyed to the transports, or to the hospitals, ashore or afloat.

“You will take care that, as far as possible, all evil influences from without be removed, so that the air inhaled by the inmates of the hospitals be not contaminated. It is reported, for instance, that the hospital ship in the harbour of Balaklava is much surrounded by dead carcasses.

“As a necessary consequence, you will order that the dead be interred at a sufficient distance from the hospitals. You will lay down rules both as to the time and mode of interment, consulting, of course, the convenience of the constituted authorities.

“Should any other hospital or receptacle for the sick be decided on while you are on this expedition, you will examine it, and state all that must be done for health, decency, and comfort.

“You will not interfere in any way with the medical and surgical treatment of the patients, nor with the regulations prescribed to the nurses and attendants.

“Upon your arrival at Constantinople, you will determine among yourselves in what way you can best carry out the objects of your mission.

“It is important that you be deeply impressed with the necessity of not resting content with an order, but that you see instantly, by yourselves or by your agents, to the commencement of the work, and to its superintendence, day by day, until it be finished.

“It is your duty, in short, to state fully, and urge strongly for adoption by the authorities, everything that you believe will tend to the preservation of health and life.

“The camp must also come under your immediate and anxious attention.

“You must consider and apply, with the least possible delay, the best antidotes or preventives to the deadly exhalations that will be emitted from the saturated soil, whenever the warmth of spring shall begin to act on the surface.

“You must consider how all decaying substances, present and future, may be removed speedily, or otherwise disposed of with safety. Also in what way the feculent matter of the camp may be rendered innoxious.

“You will pay special attention to the harbour of Balaklava, and state your opinion as to the best mode of cleansing it, and of keeping it clean from the accumulations of filth floating on the surface. It will be desirable to ascertain, not only for the convenience of the transport of the sick, &c., but also for the removal of all kinds of nuisances to the outside of the harbour, whether jetties might not be easily constructed.

“As stated in your instructions relating to the hospitals, so here you will, with the utmost possible despatch, lay your plans before the proper authorities, in order that they may be carried into execution.

“I have the honour to be, Gentlemen,

“Your obedient humble servant,

(Signed)

“PANMURE.

“DR. SUTHERLAND.

“DR. H. GAVIN.

“MR. RAWLINSON.”

NOTE.—The Right Honourable The Earl of Shaftesbury, K.G., selected the Commissioners; and probably had the principal share in drawing up the above Instructions.

If General Orders could, in all cases, have been made applicable and could have been obeyed, outside comment might have been unnecessary, and the aid of a specially-appointed Sanitary Commission during the Crimean War might not have been needed. It may, however, from experience, be assumed that there never will be General Orders framed sufficient to cover all contingencies; and we may also assume that there will be neglect now and then, from various causes. Some of the links in the chain of regulations will break, and confusion will follow. The General Orders for the army under the command of the Duke of Wellington in the Peninsula, in the Low Countries, and in France, 1809 to 1815, cannot probably be improved upon, and Lord Raglan was Secretary to the Duke. He must, consequently, have been acquainted with the Duke's General Orders; and yet we see the utter confusion into which affairs drifted in the Crimea. The siege of Sebastopol had not been provided for; and, consequently, became exceptional.

No finer body of men ever left England than composed the army of the East, 1854. Their equipment was supposed to be perfect, and the provision for their maintenance was also supposed to be ample; and yet the results soon declared deplorable failure.* To whom that failure was due it is impossible now to say. It was not, however, to any individual, but rather to the absence of an independent Sanitary department with the Army, and to the want of one home department to direct and control, having also power to order all extra stores, and to inspect their shipment, and to see that the several stores were so arranged in the transports that

* The Crimean War was, no doubt, in some degree a surprise. The country "*drifted into it*," and the siege of Sebastopol was an after-thought, for which the army was not prepared. Hence, when winter came, there were no special provisions to meet it.

they should be available in the order of their necessity, and not to have surgical appliances and medicines placed beneath a massive bulk of ammunition, as was said to have been the case in the Crimean War. Blunders of this class do not appear to have been avoided even in the recent Egyptian campaign, because past experience had been forgotten, or deliberately set on one side.

A letter by Captain Douglas Galton, R.E., C.B., &c., on the recent Egyptian Army Medical Inquiry sets forth in the clearest words how both past experience and model regulations based on that experience have been set aside. Captain Galton states :—

“ It will be in your recollection that, after the Crimean War, a Royal Commission was appointed at the instance of Lord Panmure, under the presidency of Lord Herbert of Lea, to inquire into the sanitary state of the Army. That Commission exposed the defective condition of military hospitals, the absence of any efficient organisation of general hospitals in time of war, the want of any method by which the improvements then recently introduced for the protection of health in civil life could be rendered available in barracks, camps, and hospitals ; and it showed the great loss of life arising from these defects during the war with Russia.”

Captain Galton further states that :—

“ A careful perusal of the report and evidence in the Egyptian Blue-book containing the results of the inquiry just concluded will satisfy any impartial reader that Lord Herbert’s regulations would have provided against the evils which have arisen under these new arrangements which have superseded them. Lord Herbert’s regulations provided that, in order to secure the health of the troops in the field, a sanitary officer should be attached to the Quartermaster-General’s staff, to whom, on appointment, the Director-General of the Army Medical Department

was to issue a code of instructions to meet the specialities of the campaign on all matters connected with rations, clothing, shelter for troops, sanitary arrangements, and precautions for preventing disease. The sanitary officer was to accompany the Quartermaster-General, or such officer as he might appoint, in selecting buildings for occupation by troops, whether as hospitals, quarters, or stables. He was to examine into their sanitary condition and into all matters connected with such buildings as were likely to affect the health of the troops or of the sick; and he was to advise the Quartermaster-General or his deputy on all such subjects; he was to examine into the sanitary condition of towns or villages about to be occupied, and their neighbourhood, and to make recommendations for organising a proper sanitary police to preserve cleanliness and for the removal of nuisances, as well as for the execution of such sanitary measures as he might consider necessary for protecting the health of troops in occupation. Corresponding sanitary instructions were also issued to the Quartermaster-General's department."

It will be seen, on carefully reading this letter, that practical lessons, however well taught, and also that subsequent Official Inquiries, however ably conducted, have led up to very little that has proved to be really useful when the country again enters upon war. The army medical arrangements had drifted back into the old groove, the old forms of blunders and the old stories are repeated, and yet the existing regulations are officially supposed to be, if not perfection, all that is requisite.

But officials never own to a mistake: everything done and said must, therefore, be assumed to be correct. This rule the Sanitary Commission found in full force and fully believed in by the heads of the Medical Department on the Bosphorus and in the Crimea.

With filthy, overcrowded hospitals, full of sick, and a terribly high rate of mortality, some of them asserted that all had been done and was being done that was required or practicable; and that, consequently, for the Home Government to have sent out a Sanitary Commission was an insult to the Army Medical Department. The army, they admitted, was no doubt suffering under a high rate of mortality, but then there was full and ample precedent for this state of things during war; not only in the British army, but also in Continental armies of old; as is shown by the returns relative to the rates of mortality in the armies of France, after the retreat from Russia, when 40,000 men around Paris are recorded to have died of typhus in six weeks; one-fifth of the remaining force being sick. Army Medical Officers, therefore, knowing this fearful loss of life to have been the common fate of men in war, in all armies, could see nothing exceptional in the mortality of the British soldiers on the Bosphorus.

As the Government of the day learned more from newspaper correspondents than from official returns, let us see an independent description of the condition of the camp in November, 1854. Letter by *Times* correspondent:—

“ Rain kept pouring down—the skies were black as ink—the wind howled over the staggering tents—the trenches were turned into dikes—in some of the tents water was sometimes a foot deep—our men have neither warm nor waterproof clothing—they were out for twelve hours at a time in the trenches—they were plunged into the inevitable miseries of a winter campaign—and not a soul seemed to care for their comfort, or even for their lives. These were hard truths, which, sooner or later, must have come to the ears of the people of England. It was right they should know that the most wretched

beggar who wandered about the streets of London in the rain led the life of a prince, compared with the British soldiers who were fighting for their country, and who, we were complacently assured by the home authorities, were the best appointed army in Europe."

This description, bad as it shows things to have been, indicates nothing more than a necessity for vigorous scavenging; and if there had been a properly organised staff of scavenging inspectors, and the Commander-in-Chief could have ordered the bringing in and the employment of labour, the road to the front and the camp might have been cleansed from mud in a week and have been preserved clean.

The Government at home, having had some experience of the benefits to be derived from sanitary operations, ultimately saw this, and then appointed and sent out the Army Sanitary Commission.

In Government departments I am sorry to say that there is not, on all occasions, due respect shown to the feelings of permanent officials, and, in our case, we were not put into communication with the heads of the permanent Medical Department before leaving London, nor in the Crimea; which, no doubt, gave offence, but for which the members of the Commission were in no sort of way answerable.

In my opinion, this is not the best way of using men, but it is a subject outside of my province to settle. We, the members of the Sanitary Commission, were selected to undertake important duties under new and strange conditions. We were informed that instructions would be sent out to the heads of departments, to the British Minister at Constantinople, to Lord Raglan in the Crimea, and to the Admiral on the Bosphorus, with an earnest request that they would facilitate us to the fullest

extent in our labours. We, however, had no introduction to the heads of the Medical Department.

To show how it was anticipated the Sanitary Commission would be received, I give the very characteristic extract and letter from the *Life of the late Lord Palmerston*:—

Extract from the “Life of Viscount Palmerston,”
1846–65, by the Hon. EVELYN ASHLEY. Vol. II.

SPRING OF 1855.

No time was lost by the reorganised Cabinet in remedying some of the most pressing evils which had borne down our Army in the Crimea. Lord Palmerston, in announcing to the House of Commons the formation of his Government, detailed also some of his new administrative measures. The office of Secretary of War was to be amalgamated with that of the Secretary of State in the person of Lord Panmure; a Bill was immediately to be introduced for the enlistment of older men on short service; the Admiralty was to establish a special Board to superintend the transport service; lastly, a Sanitary Commission was to be sent to the Crimea, and another, under Sir John McNeil, to superintend the commissariat. I append Lord Palmerston's letter to Lord Raglan accompanying the Sanitary Commission:—

“DOWNING STREET, *February 22, 1855.*

“MY DEAR LORD RAGLAN,

“This will be given to you by Dr. Sutherland, Chief of the Sanitary Commission, consisting of himself, Dr. Gavin, and Mr. Rawlinson, whom we have sent out to put the hospitals, the port, and the camp into a less unhealthy condition than has hitherto existed, and I request that you will give them every assistance and

support in your power. They will, of course, be opposed and thwarted by the Medical Officers, by the men who have charge of the port arrangements, and by those who have the cleaning of the camp. Their mission will be ridiculed, and their recommendations and directions set aside, unless enforced by the peremptory exercise of your authority.

“But that authority I must request you to exert in the most peremptory manner for the immediate and exact carrying into execution whatever changes of arrangement they may recommend; for these are matters on which depend the health and lives of many hundreds of men,—I may, indeed, say thousands. It is scarcely to be expected that officers, whether military or medical, whose time is wholly occupied by the pressing business of each day, should be able to give their attention or their time to the matters to which these Commissioners have for many years devoted their action and their thoughts.

“But the interposition of men skilled in this way is urgently required. The hospital at Scutari is become a hotbed of pestilence, and if no proper precautions are taken before the sun’s rays begin to be felt, your camp will become one vast seat of the most virulent plague. I hope this Commission will arrive in time to prevent much evil; but I am very sure that not one hour should be lost after their arrival in carrying into effect the precautionary and remedial measures which they may recommend.

“My dear Lord Raglan,

“Yours sincerely,

“PALMERSTON.”

Something of the opposition anticipated certainly met us, but not in any form seriously to retard our work,

as with this we commenced and went steadily on. We soon noted that the Barrack Hospital must have main sewers; as Dr. Cumming, the chief medical officer on the Bosphorus, remarked, not in the most pleasant manner, that he did not know what a Sanitary Commission could do there to prevent disease, as the wind from the Sea of Marmora would make the wards doubly foul and aggravate fever cases.

This remark led me at once to ask the engineer officer in charge if the building was sewered; when he replied that "he did not know." Upon this an orderly in attendance said: "Yes, sir, the building is sewered." I then said: "How do you know?" He replied: "If you will come with me, I will show you the sewers." There they were, with their ends fully open towards the Sea of Marmora. I at once knew the cause of the excess of fever when the wind blew in and drove the concentrated putrid sewer-gas back into the sick wards. How this state of things was remedied will be described in another part of this paper.

The Army Sanitary Commission, having landed at Constantinople, on the following day crossed the Bosphorus and inspected the Great Barrack Hospital,—a comparatively new building, and much finer in design and in construction than any barracks in Great Britain. This and the other military buildings had been designed and constructed by European engineers.

A description of these buildings by Miss Florence Nightingale must be of general interest and have special value, as she occupied one corner of the Barrack Hospital during the winter of 1854-55, and witnessed the destructive effects of overcrowding, excessive dirt, and defective ventilation.

Miss Nightingale states in notes upon her experiences at Scutari as follows :—

“The Scutari disaster was a separate problem, and must be considered by itself. It was the case of thousands of sick removed 300 miles from the causes which had occasioned the sickness, and exposed to another class of risks in the buildings into which they were received.

“The buildings were spacious and magnificent in external appearance ; far more so, indeed, than any military buildings in Great Britain, and several of them were, apparently, better suited for hospitals than any military hospitals at home.

“This merely external appearance was, however, fatally deceptive. Underneath these great structures were sewers of the worst possible construction, loaded with filth ; mere cesspools, in fact, through which the wind blew sewer-air up the pipes of numerous open privies, into the corridors and wards where the sick were lying.

“The wards had no means of ventilation, the walls were very dirty, and required lime-washing. The number of sick crowded into the hospitals during the winter of 1854–55 was disproportionately large, especially when the bad sanitary state of the buildings is taken into consideration. The population of the hospitals was increased, not only without any sanitary precautions having been taken, but while the sanitary conditions were becoming daily worse ; for the foul sewers were getting more and more dangerous, and the dirty walls more and more saturated with organic matter.

“Some slight improvements were, however, made in the beginning of March, 1855. But it was not till the 7th March that effectual measures were initiated for removing the causes of disease in the buildings, viz., through the aid of the Civil Sanitary Commission. By the month of

June the improvements were nearly completed, and the proportion of sick had fallen off, and the hospitals had by this time become healthy.

“This is a brief sketch of the history of the frightful Scutari calamity. Even from the very beginning of the occupation of these buildings in October, 1854, and before the sufferings of the winter had begun, the mortality was very high, although the number of sick was small, indicating the unhealthy state of these buildings even then. Nothing, however, was done to improve them. But fresh shiploads of sick were passed into them. The mortality, of course, continued to rise. Still nothing practically useful was done. Then came the great Crimean catastrophe, and ship after ship arrived with sick in so exhausted a condition that the foul air of these hospitals was almost certain death to them, and accordingly they died, in the month of February, 1855, at a rate of 415 per cent. per annum. So that in twelve months, at such a rate, the whole sick population of the hospitals would have perished four times over. In February two out of every five cases treated died in the hospitals of the Bosphorus, and at Koulali one out of every two. Well may this incredible mortality teach us a terrible lesson !

“The reduction in the mortality, after the sanitary works were begun, is most striking, as it falls eventually to less than a *sixth* part of what it was when the Barrack and General Hospitals were occupied together in October, 1854, and to a *nineteenth* part of what it was in February, 1855. Our general hospitals have been so deplorably mismanaged in all our wars, that the question has been raised as to whether it would not be better to do without them altogether. The experience of Scutari proves that general hospitals may become pest-houses

from neglect, or may, by proper treatment, be made as healthy as any other buildings.

“These are the facts of Scutari hospitals during the first year of our occupation. Nothing in the sanitary recommendations we have been analysing (that is, the army medical sanitary arrangements), unless it be some suggestions made when it was too late, would have led us to suppose that there was anything seriously wrong in these hospitals; or, that their defects had any share in the destruction of the British sick, who have given a name to these buildings in history.”

* * * * *

Further to illustrate the condition of these buildings and their surroundings, the following extracts from the Report of the Sanitary Commission are given, commencing 7th March, 1855 :—

“On entering the Great Barrack Hospital, the first thing that attracted our attention was the fearfully dirty state of the ground around the buildings used as hospitals, and the defective state of the ventilation.

“Excepting a few small openings here and there, there were no means of renewing the atmosphere within this hospital, the large cubic space above the tops of the ward windows always retaining a considerable amount of hot and foul air for which there was no escape. There was not even an open fireplace connected with the building; the wards were, therefore, heated by stoves, the pipes of which passed through a small hole at the top of one of the windows in each room.

“The communication between the wards and corridors, in the majority of instances, was by doors; and hence, as these doors were shut, that free circulation and

perflation of the atmosphere so necessary in military hospitals was impossible.

“The upper parts of the windows in the privies, and in the galleries connecting them with the corridors, were at once removed or broken, so as to allow the emanations to escape into the external atmosphere.*

“The rooms are large and lofty, and have generally three windows each, but much too small for their cubic contents; and the heads of these windows do not reach to within five or six feet of the ceiling. The window space in the corridors is considerable, and the heads of the windows came up much closer to the ceiling. The different flats of the building communicate by large and roomy stone staircases.

“To remedy the defective ventilation, the Commission recommended that the upper portion of the windows should in all cases be opened, and the current of air modified by the insertion of perforated zinc plates, louver boarding, or otherwise; that adequate space for the escape of foul air should be provided as near as possible to the ceiling of each ward; and that the staircases should be used for ventilating-shafts, by large square openings being made through their ceilings and through the roof.”

The ventilation in the General Hospital was much less objectionable. This building had sash-windows.

* The windows were not casements but fixtures, and could not consequently be opened from the top. The only remedy immediately available was, therefore, to break out all the top squares, and this was at once done, and so permitting foul air to escape and fresh air to enter by tens of thousands of cubic feet each hour. Peat-charcoal was scattered twice a day over the putrid excreta. The open ends of the large sewers were covered with old tent-cloth and large ventilating-shafts broken outside the Barrack walls. The results were almost magical.

“Both wards and corridors were, however, used for the sick, but the disposable means of ventilation were such that this hospital could hardly be said to be overcrowded.

“Permanent and independent ventilating arrangements, by perforated zinc panes in the windows and ventilating openings at the ceilings, were here also directed to be introduced for the wards—the same as those for the Barrack Hospital.

“The upper window sashes in the privies and galleries were directed to be removed, so as to let out the foul air and prevent, as far as practicable, dangerous effluvia from entering the corridors.

“The General Hospital, like the Barrack Hospital, is divided longitudinally, all round, into wards and corridors; the wards facing outwards, and the corridors facing towards the courtyard. But it differs from the Barrack Hospital in one important particular—namely, that the rooms and corridors communicate, not only by the doors, but also by numerous large and lofty sash-windows situate in the division-walls, so that by proper management of the windows, and by the introduction of perforated zinc-panes, and also by suitable ventilating openings at the ceiling of each ward, a thorough ventilation could be at all times secured.”

With regard to the ill effects of defective drainage, so much has been said, that a few extracts from the diary of the Sanitary Commission may be necessary.

“We found the sewerage belonging to the Barrack Hospital in a most defective condition. The sewers and drains were large, badly formed, rudely constructed, irregular in invert gradient, untrapped, and impeded with putrid refuse.

“It may be here stated generally that all the buildings used as Hospitals were sewered. Turkish sewers are made of rubble-stone or coarse brickwork, the largest sewers having a sectional area equal to 6 ft. in height and 4 ft. in width, arched over; smaller sewers square on section, about 3 ft. by 3 ft., covered with rough flat stones. The bottoms are flat, rough, and uneven; there were no means of external ventilation, no means for cleansing or flushing, and the ends or mouths of the sewers at Scutari opened above the level of the sea, and were exposed to the action of the winds, which, in certain directions, blew into the sewers’ ends, and carried the foul emanations from the deposits within them through the pipe-drains to the Turkish privies, and thence into the corridors and wards where the sick were placed. It was stated to us by Dr. Cumming that a change of wind had been observed to be attended by an accession of fever cases among the sick, and that existing fever cases put on a more aggravated form. We found that the winds to which these results were attributed blew in the direction of the open mouths of the large sewers. These sewers were, in fact, elongated cesspools of the most dangerous description, through which, and through the Turkish privies, the wind forced putrid sewer-gases directly into the wards of the Hospital.

“The exhalations escaping through the defective walls and covers of the sewers, where they happened to pass close to or underneath occupied rooms, could, in some instances, be distinctly observed within the rooms, and there is reason to believe that fatal cases, both of fever and cholera, arose from this circumstance among the inmates.

“In order to diminish, as far as practicable, the injurious emanations proceeding from these sewers and Turkish privies, it was directed that the outfall-sewers of the Hospital should be extended, and a canvas cover

placed over their mouths to prevent the wind driving the effluvia into the Hospital; that three openings for ventilation should be made in each main-sewer between the Hospital and the outfall, with a water-trap at each sewer ventilator, and a man-hole for subsequent cleansing: water-tanks for flushing the sewers were also directed to be placed immediately outside the walls of the building. These tanks consisted of hogsheads, each having a large wooden valve covering a pipe communicating with the head of each sewer. The Inspector was directed to see that these flushing-tanks were filled with water three times a day, and the valves opened suddenly by himself.

“All the privies, sewers, and drains were directed to be thoroughly cleansed, and their contents deodorized and removed. It was further directed that peat-charcoal should be freely used as a deodorizer for these purposes.

“The privies of this large building (the General Hospital) are situated in four square towers, built on the outside of the Hospital, instead of being within the square, as in the Barrack Hospital. One of the towers is situated at each angle of the main building and communicates with the interior by means of a gallery opening into each corridor. The windows of these galleries were all closed at the time of our first examination, and as the structure of the privies and the arrangement of the drainage were essentially the same as in the Barrack Hospital, the effluvia entered the corridors and could be easily detected within them at some distance from the doors.

“This constituted the main sanitary defect of the General Hospital; but it was a very dangerous one, and neutralised, to a great extent, the advantages possessed by the building.

“On several occasions, both in the Barrack and other

Hospitals, we saw the excreta of patients in utensils under the bed, instead of having been at once removed.

“The effluvia from the privies had free access to the corridors, and so added materially to the impurity of the air.

“The first step taken by the Commissioners was to examine carefully the outskirts of the Barrack Hospital, to ascertain whether there were any external causes likely to affect the purity of the surrounding atmosphere.

“The site of the Hospital, as already stated, is open and airy, overlooking the Sea of Marmora on two sides, and on the third side facing the open country; on the fourth side it is contiguous to one extremity of Scutari, which, like all Turkish towns, we found to be in a bad sanitary condition. The paving was rough and badly laid, and the channelling very defective. The surface, in many places, was filthy, and had putrefying mud lying in hollows, and there were nuisances among the houses. The ravine to the south-east of the Hospital contained offensive deposit, which tainted the air on that side of the building. There was some refuse and several dead dogs lying close to the Hospital walls.

“The surface of the inner square of the Barrack Hospital was uneven, badly formed, imperfectly drained, and very dirty.

“Four detached buildings within the court-yard, one at each angle of the square and communicating with the corridors, contain the Turkish privies: these buildings open into each line of corridors by two large doors, one on each side of the angle. By this arrangement each corridor in the circuit of the building communicates with the privies by eight doors. The privies consist merely of

a marble slab with a circular opening at the surface, communicating with a vertical pipe of red tile, carried down into a drain at the basement of the building. These privies, and the galleries between them and the corridors, are lighted by a number of glazed windows, which we found were all closed, so that there was a direct communication between the sewers, which were loaded with putrid filth, and with the corridors and wards of the Hospital.

“The Turks, as it is known to those who have travelled in the East, are remarkably decorous in their habits, and the privies on the side of these long corridors were separated from each corridor by an ante-room : the door leading into the ante-room was, however, not opposite to that which led to the privies, so that it was impossible, even if the door had been opened, for any one to obtain a view of those places. The Turks use water, and therefore the soil-pipes were very small; and there were (as it is a part of their religion to wash after using these necessities) small water-taps on the left-hand side for the purpose. When the army was at the Barracks in the summer, these taps were, by the soldiers, broken off; and, in consequence, the supply of water was stopped. When the Barrack was re-opened as an Hospital, no sufficient pains were taken to repair those pipes, or to secure a flow of water, and the drain-pipes choked up; and the liquid fæces, the evacuations from those affected with diarrhœa, filled up the drain-pipes and floated up over the floor, coming into the room in which the privies were, flowing into the ante-room, where the foul matter was more than an inch in depth; men suffering from diarrhœa who had no slippers nor shoes, as this flood of filth advanced, came less and less near to the privy openings, and nearer and nearer to the door, till, at last, excreta was within a yard of

the ante-room ; and, in consequence, the smell from this place was such as not fully to be described.

* * * * *

“ Connected with this question of overcrowding, we may state that we found a considerable portion of the Barrack Hospital in use as a dépôt. We considered that the presence of so many soldiers and other persons not necessary for the treatment of the sick was a source of danger, from their occupying cubic space within the building and increasing the impurity of the air from the defective privy drainage ; of the truth of which opinion we had subsequently two striking confirmations.

“ All the hospitals had a water-supply. That for the Barrack Hospital was found to be hardly sufficient in amount for so large a number of sick. The water was not so pure as could have been desired, and it was received into tanks within the Barrack square.

“ Speaking generally, we were of opinion that the walls of the wards and corridors were not so clean as they might have been.

“ There were false-floors in the wards which had been used for sleeping-berths for the Turkish soldiers, and which had the bedsteads of the sick placed on them. There were also box-seats along the walls of the wards for the use of the soldiers. We were of opinion that there ought to have been no such enclosed spaces capable of collecting dirt and foul air within the walls, and that it would have been advisable to have removed the whole of this useless woodwork before the sick were put into the wards, had there been time and means for doing so.

“ We directed the frequent use of quicklime-wash for the purpose of cleansing the walls and improving the

atmosphere in the wards and corridors. This we considered one of the most important sanitary precautions which could be adopted. Experience has shown that all porous substances, such as the plaster of walls and ceilings, and even woodwork, absorb the emanations proceeding from the bodies and breath of the sick. After a time, the plaster becomes saturated with organic matter, and is a fresh source of impurity to the air of the ward. It hence follows that, unless the walls and ceilings of hospitals be constructed of absolutely non-absorbent materials, it is necessary, at short intervals, to use some application capable of neutralising or destroying the absorbed organic matter. Of all known materials, quicklime-wash is the best and cheapest for this purpose. Its effect in freshening the air in crowded wards and rooms is immediate, and it is one of the most efficacious agents for mitigating the virulence of epidemic disease."

The following is a summary of the work done during the period of Mr. Wilson's inspectorship about five months:—

Hand-cart or large basketfuls of filth removed ...	5,114
Sewers and latrines flushed (times)	466
Carcasses of animals buried	35

Weekly abstract of Mr. Wilson's Scavenging Diaries.

Week ending March 24.

"Thirteen men, on an average, employed in cleansing the surface of the ground in the vicinity of the Barrack Hospital and at Kulali, in removing the refuse, burying animals, &c. During the week there were collected and removed from the vicinity of the Barrack Hospital 202 hand-cart or basketfuls of filth, rubbish, and offensive

matter. Two tons of filth were removed at Kulali. The carcasses of fifteen dogs and two horses were buried, and the sewers of the Barrack Hospital were flushed three times.

Week ending March 31.

“The cleansing operations were extended to the General Hospital and Palace Hospital this week. The number of men employed was twenty on the average. The ground about both Hospitals, and that portion of the village nearest the Barrack Hospital, was swept clean. A large sewer within the barrack square was opened by order of the Commissioners, and forty-two hand-cartfuls of putrid filth removed from it. The sewers connected with the privies were opened and cleansed, and twenty-six hand-cartfuls of filth removed from them. A sewer at the General Hospital was also opened and cleansed, and fourteen hand-cartfuls of filth were removed from it. Water was carried to the flushing tanks, and the sewers at the Barrack Hospital were flushed nineteen times in the course of the week. The total filth and refuse removed from the vicinity of Barrack, General, and Palace Hospitals, during this week, was 354 hand-cart or basketfuls, and the carcasses of seven dead animals were buried. Peat-charcoal was used in the cleansing operations.

Week ending April 7.

“The ground about the Barrack, General and Palace Hospitals was swept as usual, also part of the Village of Scutari; an offensive sewer at the Barrack Hospital was cleansed. The average number of men employed during the week was twenty-five. There were 297 hand-cart or basketfuls of filth removed. Water was carried to the flushing tanks, and the sewers and privies at the Barrack

Hospital were flushed twenty-one times. The Hospital at Kulali was inspected. Peat-charcoal was used for deodorizing the privies. The ground round the Hospital was cleansed and the privies flushed.

Week ending April 14.

“The average number of men employed this week was twenty. The ground about the Hospitals was swept as usual and 215 hand-cart or basketfuls of filth were removed. Water was carried to the flushing tanks, and the sewers at the Barrack Hospital were flushed nineteen times during the week. The carcasses of two horses, a cow, and four dogs were buried.

Week ending April 21.

“Several large foul sewers were opened at the Barrack Hospital, by order of the Commissioners; peat-charcoal was applied to deodorize their contents, and above 100 hand-cartfuls of filth were removed from them. The ground around all the Hospitals cleansed. The filth and refuse collected and removed during the week amounted to 417 hand-cart or basketfuls. Water was carried to the flushing tanks, and the sewers and privies at the Barrack Hospital were flushed out twenty-four times. Peat-charcoal was applied to the privies every day. A dead horse was buried. The average number of men employed during the week was 26.”

Similar cleansing works were carried out to the end of the war.

If this paper does not serve some other purpose than detailing scavenging work done by the Sanitary Commission, it will have been written in vain. It is, however, my intention to show how surface-filth may accumulate under

neglect of scavenging in camps, villages, and hospitals, and how little, comparatively, is required to prevent much misery and loss of life. Take the case of Balaklava, as described by the *Times* correspondent, as an example; it was so utterly neglected on its first occupation in the way of scavenging:—

Balaklava.—“As to the town itself, words could not describe its filth, its horrors, its hospitals, its burials, its dead and dying Turks, its crowded lanes, its noisome sheds, its beastly purlieus, or its decay: all the pictures ever drawn of plague and pestilence, from the work of the inspired writer who chronicled the woes of infidel Egypt, down to the narratives of Boccaccio, De Foe, or Moltke, fall short.”

The harbour of Balaklava was also in a sad state of filth, even as late as April, 1855. The Sanitary Commission, however, arranged with Admiral Boxer to have two flat-bottomed boats manned, to act as scavengers' carts act in towns,—going round, morning and evening, from ship to ship, to receive any refuse, take it outside, and discharge it in the sea into deep water.

All carcasses floating in the harbour were also towed out to sea and cut up so as to sink. Cattle steamers were ordered to “bank fires,” and discharge cargo; then to fire up, go out to sea five or six miles from shore, clean decks, and come in and wait orders.

The Sanitary Commission does not pretend to claim credit for all the improvements which took place in the camp from the spring of 1855 to the end of the war, because the example set by them was followed. Lord Raglan interpreted the instructions issued to the Commission liberally, and promptly seconded each report issued by the Commission with a supplemental order that works of cleansing should be carried out over the entire camp. The

French, however, though seeing these improvements in British hospitals and camp, took no corresponding measures to scavenge and cleanse, and suffered for their neglect.

In the spring of 1855 other great improvements took place: huts had been sent out with warm clothing; and sheep, as also preserved and potted meats, arrived in abundance. The weather became genial, the mud dried, and roads had been repaired. Some of the huts had, however, been improperly pushed into the hillside (occupied by the Highland Brigade), where the strata happened to be clay, and these became a sort of cellar dwelling. The roof being of impervious felt, prevented ventilation. The earth around and beneath the huts became sodden with wet, and, as a consequence, fever prevailed. These huts were ordered to be removed, and were taken down, but only after doing much mischief.

The Blue-book Report (1883) on the organisation of the Army Hospital Corps in Egypt reveals many blunders of a type as old as the service, such as confusion in transmitting materials for use; and something worse than confusion in contract supplies, both of materials and of provisions. Can there be no better service in future?

War is, no doubt, a blundering, extravagant, and destructive business under any aspect, and the best framed regulations come to be disregarded; and even where adhered to they may, at times, bring about the worst possible forms of extravagance. The Egyptian report most fully sets forth the confusion into which the regulations fell, and the suffering which resulted. Detachments of the army had, however, to be removed suddenly, and the impedimenta necessary for use could not follow as rapidly. Then provision was made for contingencies which never happened, and, most fortunately

for the men, the war came to an abrupt and unexpected termination.

Men on the march, we must remember, are loaded like beasts of burthen. They have to march under their impedimenta, so that the whole body may be bathed in perspiration, feeding must be irregular, and water may be absent or may be polluted, and then in one night's bivouack the body may be chilled, so that fever to a large proportion of the men must be the result; and that there must necessarily be great loss of human life in actual war will be self-evident to any one who knows the least possible about the subject, the elements for which no previous calculation which shall be reliable can be made being by far the most destructive. No forethought can fully guard against excessive changes in weather, and excessive wet and excessive cold are far more destructive than any results brought about by fighting. Indeed, the fighting portion of a soldier's life is usually of short duration. It is not in battle that armies are destroyed, but on the field, in camp, and in foul hospitals.

Where an army in the field is either advancing or retreating, there must be exposure to the elements; but even under these conditions a properly-organised sanitary staff may be most useful. Temporary sheds may be quickly erected, and some form of bed be provided to raise sick men out of the mud, and not to allow them, as in the Crimea during the first winter, to be laid on the bleak ground on the side of Balaklava Harbour all the night through, rain or fair, frost or snow, without the least shed-protection, until the poor emaciated sick could be taken on board some transport, but in many cases only that the body might be thrown overboard the first thing in the morning.

Any buildings to be used by sick or by broken-down and wounded men should, as taught by Sir John Pringle, at once have the windows removed to prevent injury by polluted air, and any improved apparatus provided for water-supply be brought into use. Food, in a concentrated and portable form, may now be served out, and the horrible salt junk and ration-pork be in future dispensed with. A spirit-ration is liable to be most injurious in several ways, and should not be used except as a medicine.

In the question of shoes and clothing, these should be the best in make, and of the best material; and as to food, England could afford to feed her troops in the field on turtle-soup, if this would reduce the mortality, as men will now ever be the dearest commodity. We have not conscription, neither do I think it is likely to again be available. There had better, then, be no stint in feeding.

For water-supply, light carts of steel, similar in form to watering-carts in towns, may be of great utility, as one horse or one mule would easily draw to a distance of one or two miles from 100 to 200 gallons of water, to be served out to the men in the positions occupied. Portable water-filters can also be easily arranged, to be similar in form to the light steel water-carts; so that water for hospital purposes may be filtered even in its transmission. Water, which weighs 10 lb. to the gallon, is heavy to carry, and would be carted much more readily. Good water, to be supplied rapidly, will be as useful as good and wholesome food, and a prompt supply of both will ever, in war, be of the utmost importance.

In the army of Sweden, the men's shoes and feet are specially attended to; and as Napoleon's remark, that he depended as much upon the legs of his soldiers as upon

their arms, is a truism, it will be self-evident that contract boots and shoes, with absorbent soles, ought to be avoided. The old ditty,—“For want of a nail, the shoe was lost; for want of the shoe, the horse was lost; and for want of the horse, the man was lost,”—is applicable to military operations in actual war.

Where an army for a time becomes stationary, a sanitary corps will find ample work to do in improving roads, in surface-draining, in scavenging, and in ventilating any permanent buildings used as hospitals; and, if the service will permit of a use of working parties, enormous benefits may be secured to the entire force in the field. Any arrangements which will preserve the men in better health will be for the advantage of the entire force. During the late Russian war with Turkey, some of the correspondents gave descriptions of removable filth even in the vicinity of the Emperor's quarters, which indicated clearly that no sanitary staff had been appointed with the Russian army. The lessons which might have been learned from Crimean and Sebastopol experience had been of no avail.

A skilled sanitary officer will be a man of many expedients springing from close and intelligent observations; and, in his works, he will strive to save labour. Every country has its character impressed on its surface contours, and these the geologist and engineer will read at a glance. Wide and flat areas will indicate, as a rule, a soft subsoil; a steep gradient will indicate a subsoil of some hard material, such as gravel; rock will generally show above the surface; where there are mountains, there will usually be at the base mounds of material,—particles weathered from the rock and admirably suited for road-forming, as it may be excavated and sorted so as to save the labour of quarrying and breaking for road-

making. This was the case in the Crimea on the margin of the road from Balaklava to the front. This road, the first winter, was (in the lower part of the valley) by the wheel traffic worn into almost impassable mud. To repair this road we found the Royal Engineers were blasting rock at a distance to break into road material, when at the foot of the mountain, and close to the road, there were hundreds, if not thousands, of tons of stone ready broken—that is, the “*talus*” weathered and washed down during untold years from the mountain. Much of this material the Sanitary Commission caused to be removed to cover the graves of the soldiers and camp-followers buried at the head of the harbour. If this material had been used from the first to preserve the road to the front in order, there need have been no railway, much suffering would have been prevented, and many lives have been saved. How the roads and the camping grounds in the Crimea came to be in the sad condition they were in is, even now, to me a mystery. Let any one read the graphic letters of the *Times* correspondent, as quoted in this paper, to see what was their condition. Ammunition - wagons broke down, commissariat carts broke down, horses broke down, and men broke down in this terrible mud. Horses lay down in it, were frozen to the ground, and broke their backs in attempting to rise out of it.

In the Crimea there were wells and natural springs of water which were not made the best use of, either for the men or for the horses. The wells were broken down, and the water from the springs, when not actually drawn for use, flowed to waste. All wells, in future, should be under the charge of an orderly. All springs should be impounded, and watering-troughs for horses should be filled separately, and the approaches be paved to prevent

the ground being trampled into deep mud, as I saw it.* A sanitary engineer officer will know something of meteorology ; and where there are streams or rivers, he will see at a glance if these are liable to floods (as each river writes its own history on its margins), and will take care that troops and stores, when stationary for any period, are placed out of the flood-lines. This was not done in the Crimea above Balaklava, and resulted in the loss of stores and of human lives also. Even the Sardinian engineers committed this blunder.

A railway was constructed from Balaklava to the camp, which was certainly used for some purposes. But, at the time this railway was in progress, there were hundreds of mules and horses standing idle in the mud at the head of the harbour, without nosebags, and hundreds more at Sinope, on the opposite side of the Black Sea. These animals were subsequently used by the Land Transport Corps, when it had been organised under General McDermoch. The railway was ridiculed in the Crimea.

We learn that materials to construct railways had been shipped with the expedition to Egypt, but that, as usual, things were wrongly placed—sleepers were below the rails ; but as neither sleepers nor rails were required, this did not much matter. This idea of railway-making seems to have grown into a mania with our generals. Materials, we know, were sent out to the Coast of Africa, at a cost, it was said, of about £90,000, to make a railway during the Ashantee War. These materials, however,

* The Commission, in inspecting the camp, pointed out to certain Engineer officers the absolute necessity there was to construct dams to impound the spring-water, and to arrange for drawing water without wasting and slopping so as to cause mud. Work of this sort was done subsequently.

were never used for the purposes intended. If future wars are to be concentrated on one spot, and armies are to be stationary, as before Troy, for months and years, temporary railways may be useful, but not otherwise.

In future wars it is admitted that picks and spades may require to be used as much, if not even more, than rifles. All officers will, therefore, have to learn something of engineering; and if soldiers can use pick and spade to provide earthwork shelter from rifle-bullets, they may also use these implements for sanitary purposes. A working army will be more contented if they find that their labour tends to their safety and comfort. Idleness is an incentive to vice, and leads to insubordination.

A modern army will be a very different body of men to those forming the Peninsular army under Wellington, and must be treated very differently. Flogging is for ever done with, and it is most disgraceful to have any attempt at its renewal.

War ever has been, and ever will be, a destructive, wasteful, and rough process; and he is the best general who moves his army most rapidly with the least loss of men, and with the least cost in material. And to accomplish these ends there must be aptitude and intelligence, not only in the commander-in-chief, but also in his generals. They must be ready to turn everything available at once to account. It will not do to work by routine, regulations, and requisitions written out on "foolscap paper, half margin, one side only."

I suppose the General Orders of the Duke of Wellington are considered good examples; but the Duke, in the Peninsula, ever did something more than unceasingly refer even to his own General Orders. His personal observation was incessant, his perceptions rapid; and

consequently his instructions, outside any order-book, were practical, being suited to the conditions and requirements of place and time. Take the instances here quoted :—

CIRCULAR LETTER.

“ To the Officer Commanding.

“ FRENDA, 28th Nov., 1812.

“ I have ordered the army into cantonments. . . . The discipline of every army, after a long and active campaign, becomes in some degree relaxed, and requires the utmost attention on the part of the Generals and Officers to bring it back to the state in which it ought to be for service; but I am concerned to have to observe, that the army under my command has fallen off in this respect, in the late campaign, to a greater degree than any army with which I have ever served, or of which I have ever read. Yet this army has met with no disaster; it has suffered no privations which but trifling attention on the part of the Officers could not have prevented. . . .”

This letter is full and severe, and must have wakened up the officers to fuller attention to their duties. But the Duke points to minute details worthy of adoption now, as, for instance :—

“ In regard to the food of the soldiers, I have frequently observed and lamented in the late campaign the facility and celerity with which the French soldiers cooked in comparison with those of our army.”

Again, as to water-supply and cooking :—“ Certain men of each company should be appointed to cut and bring in

wood, others to fetch water, and others to get the meat and vegetables to be cooked ; and it would soon be found, if this practice were daily enforced, and a particular hour for seeing their dinners, and for the men dining, named, as it ought to be, equally as for the parade, that cooking would be more regular and better."

The suggestions of the great Duke point to something to be done by commanders of regiments outside of cut-and-dried formal regulations. But with the Duke's General Orders and letters to study and learn, how did our army in the Crimea, 1854-55, fare before Sebastopol? The men were encamped in a bare and bleak country, without means to make fires for cooking, with salt beef and pork, raw coffee berries and ration rum, undue exposure to the elements, and no change of clothing. Officers and men became emaciated, their clothing swarming with vermin, and yet, at a few miles distant, in the harbour of Balaklava there was the finest transport fleet of steamers in existence available, with the richest country in the world open to be drawn upon, and yet, in that first dread winter, November 1854 to April 1855—six months—out of 31,333 men, some 10,283 died of disease—one out of three, nearly. The officers did not superintend cooking, they had nothing to cook with, there was not an organised water-supply service. Some colonels of regiments did more than others, but, as the results show, there was terrible mismanagement somewhere. We know that in the spring of 1855 the Government of the day sent out two Commissions to inquire and report as to the cause of the terrible disasters. And some of us know the sort of reception their reports had accorded.

I think it may be gathered from my remarks that the purport of this paper is to show that to preserve an army in health, either in hospital, in barracks, or in the

field, will, as in the past, so in the future, require active intervention on the part of the Commander-in-Chief, of the Generals, and of the Colonels and officers, outside any printed regulations, however full and ample. As the Duke of Wellington explained on one occasion to the House of Lords : that martial law was no law, other than the will of the Commander-in-Chief ; so, in future, the Commander-in-Chief, during a state of war, must have the power to relax any published General Order or regulation, if necessary to make better provisions for the army. A sanitary staff, as provided for by the late Lord Herbert, distinct and separate from both Commissariat and Army Medical Departments, should be with and part of the army, under the direct control of the Commander-in-Chief, who should have power to order and expend in this service as he might think necessary. That is, that any amount of extraneous labour might be provided and paid for which he might deem necessary, and the country in which he might be could supply.

The army in the Crimea was most materially benefited by voluntary efforts from home, by relations, and by the general public shipping out warm clothing, by Florence Nightingale and her lady nursing, by distribution of food suited to sick men in hospital, and by extra voluntary furnishing of medical comforts ; then there were the works and labours of the Army Sanitary Commission. The expenditures by all these parties were, however, mere fractions in the gross costs of the war, which were some hundred millions sterling. The total money value of all the extra distributions of clothing, food, nursing, and sanitary appliance did not, I suppose, reach half a million sterling ; so that, if these entire extras had been provided for, it would only have amounted to about half a week's expenditure of the cost of the war.

Sanitary science, in its fulness, is a science of modern growth. There must, however, have been wise men and generals in olden times, and the great generals of antiquity must have been good sanitarians, or Alexander the Great could not have marched an army of Greeks through Asia Minor on to India and back. Hannibal could not have crossed from Africa to Italy, neither could the emperors of Rome have made the conquests they accomplished.

I confess that it put a blush on my face when I left the Crimea, and passed from Sinope on to Trebizond in Asia Minor, knowing and feeling what had occurred to the British army in the Crimea, and then to reflect that it was on through this country I then looked upon, with wide and rapid rivers, that Alexander marched his army hundreds of miles, crossing mountain ranges in mid-winter breast-deep in snow—as it is recorded,—then on to India, fighting great battles, and returning safely; whilst England—the richest nation in the world—had, in a few months of the first winter, lost the finest army that ever left her shores, and that within seven miles of the most complete base of operations any general ever had established for him. It did not need much reflection to learn that there must have been many sad deficiencies in our army arrangements for the field. As the Army Sanitary Commission have fully set forth in their Report, there were, on the Bosphorus, dirty hospitals exposed to sewer air, malaria; a dirty and polluted harbour at Balaklava, and in the Crimea absence of proper roads; no scavenging; and a neglected water-supply in the camp.

Howard drew attention to the neglected state of prisons in his day; and now, in consequence of his exposures, these places have been improved until the safest place for health is in a British prison. The late

Lord Herbert drew attention, in the Barrack and Hospital Reports, to the state of barracks and military hospitals in Great Britain, and both barracks and hospitals have been improved, though by no means, in all cases, to a state so perfect as prisons. The urine-tub of the night is, however, no longer the only ablution-tub of the morning; and men in barracks may have their meat cooked other than by boiling; and the Herbert and Netley Hospitals are improved examples of hospital accommodation. Let us hope that the science of Hygiene for Armies in the Field will meet with due and equal improvements.

If Professor De Chaumont is consulted, as he ought to be, or whoever is at the head of the School of Military Hygiene, there will not be the breaks down now complained of.

In touching on this question of army hygiene, even at this day, I know that I, as an outsider, am venturing on disputed ground. But that enormous improvement took place in the British army in the Crimea, from some cause or causes, after the advent of the Sanitary Commission cannot be disputed; but, officially, the credit has never been accorded to that Commission. The one great fact was, however, made unmistakable—namely, that from the spring of 1855 the health and condition of the British army began to improve, until, by the autumn of that year, the entire force in the field was in a state of health, and was under a less rate of mortality than when in barracks at home; and this continued until the close of the war. The French, the Sardinians, and the Russian soldiers, however, knew of no such abatement of camp and hospital sickness, the destruction of life having gone on up to the close of the war. Details may be found in the Reports, as also in the Army Returns of the several nations, and

in a pamphlet by Surgeon-General T. Longmore, entitled "The Sanitary Contrasts of the British and French Armies during the Crimean War," published 1883, as well as in other Reports and papers.

Surgeon-General Longmore (page 19) states:—"The root of the evils which led to the lamentable condition of the British troops in the hospitals no less than in the camps, during the first part of the war, was, undoubtedly, the neglect of the old maxim, 'to be prepared for war in time of peace.'

"This neglect existed in all departments of the army, in none more so than in the medical department. Nothing was ready for a state of war."

The contrasts between the earliest and later states of health of the British troops is shown by returns as under:—

First winter, 1854-55, strength of force (average) 31,333. Losses from disease from November, 1854, to April, 1855, 10,283; second winter, 1855-56, strength of force, 50,166. Losses from disease, from November, 1855, and April, 1856, 551.

The total number of deaths from disease during the whole campaign was 16,297. Out of each 100 of this total number of deaths, 63 occurred during the first winter, and 3·38 per 100 the second winter.

Without giving the full details furnished by Surgeon-General Longmore, I may state, from page 17-18: the British Army, in the first winter, had 2,286 deaths from fevers of all kinds; second winter reduced to 129. Under typhus, from 164 to 16. Amongst the French troops, 90 the first winter, 10,278 the second winter. The French had no sanitary commission, the hospitals remained unscavenged, unventilated, and their hospital drains

unimproved, the result being excessive overcrowding, until men and doctors alike perished; the British hospitals being absolutely free from typhus cases. Taking these results into account, Surgeon-General Longmore states: "It is well that the practical lessons in sanitary science afforded by the events of the Crimean War should not be allowed to pass out of mind." In these remarks I most cordially agree.

This paper ought to teach one simple lesson,—namely, that scavenging should be provided for, and practised whenever an army is in camp. If buildings are occupied for hospital or barrack purposes, their condition should at once be brought under the attention and operation of the engineer sanitary officer, that he may see to any sewerage, draining, privy accommodation, water-supply, and, above all, ventilation; as where buildings are occupied there will be a liability to crowd them, and if there is not adequate ventilation, foul air will kill more certainly and swiftly than the elements. If the great buildings on the Bosphorus which were used as British hospitals had been dealt with on their first occupation as they were dealt with in the spring of the second year of occupation, very many lives would have been saved.

With respect to ventilation of buildings, there is a prevailing fear of outside air, especially if this is cold. In civil life some people sleep in rooms with fireplace flue closed, and doors and windows tight shut up; others, more sensible,—even delicate ladies—never have their bedroom window closed, frost or snow, fog or rain, all through the year, as they know that lung-tainted air within a room is far worse for health than any outside air can be.

Extravagance in estimates and in expenditure should not be tolerated: but there may be two definitions of

extravagance. A British soldier has a certain money-value, which is high as compared with the value in some Continental armies; he ought, therefore, to be cared for and provided for so as to preserve this value to the purposes of the nation. A soldier, to be efficient, must be sound "wind and limb," or he can neither march nor fight when required. In the matters of shoes and clothing, if cheap shoes or boots cripple the men's feet, they are very dear, and it will be cheaper to have the best-made and best-fitting shoes at double the price of the bad and cheap ones. The same may be said of clothes, of food, and of hospital and barrack accommodation. Soldiers and sailors ought to be as much cared for as criminals, and when the Government has attained to this knowledge, and will develop it in practice, the lives of our soldiers and sailors will also be developed to their utmost capacity, and, according to all experience, the results will warrant the money expenditure and extra care.

The following extracts will show that, until very recently, there was not much comfort nor safety to health for soldiers in barracks. If the evidence were not so unmistakably clear and distinct, few people would have credited the fact that the urine-tub of the night was the ablution-tub in the morning. But so it was, and it is some satisfaction to know that this abomination has been done away with.

Barrack - rooms were also overcrowded and under-ventilated. Regulation space was 450 cubic feet per man, with little ventilation; 1,000 feet per man, with abundant ventilation, is provided in cells for prisoners.

Extracts from the Report of the Commissioners appointed to inquire into the Regulations affecting the Sanitary Condition of the Army, the Organisation of Military Hospitals, and the Treatment of the Sick and Wounded. Evidence of Major-General Sir R. AIREY, K.C.B., 29th May, 1857.

Question 1564.—Report of Barrack Committee. Sergeant BROWN is asked:—

“Have you often gone into the men’s rooms in the morning before the windows were open? Yes.

“In what state did you find the atmosphere? In a very thick and nasty state, especially if I came in out of fresh air.

“If I went in out of my own rooms sometimes, I could not bear it till I had ordered the windows to be opened to make a draught.

“I have often retired to the passage, and called to the orderly man to open the windows. The air was offensive, both from the men’s breath, and from the urine-tubs in the room.”

3060. How are the men’s rations cooked? A company is generally provided with two boilers, in one of which the soldiers boil their meat, and in the other they boil their potatoes; they have nothing else. A man goes on with it from the day that he enlists till he is discharged. He lives upon boiled meat for twenty-one years.

3061. Do you believe that is distasteful to the men? I am persuaded, having commanded a regiment for fourteen years, that the men are perfectly sickened with it.

3062. Has it come under your notice that they do not consume the rations? Constantly. I have seen the

meat, after it has been boiled down to shreds, thrown away—the men would not look at it.

3063. Do you think that that arises from the ration being larger than is necessary for the men's subsistence? The meat ration is insufficient. I do not think that the soldier gets enough. I think that three-quarters of a pound of meat, including bone, is quite insufficient for the soldier.

3064. Even if you had a sufficient weight of meat, do you think that it could be made more available than it is now, and more agreeable to the soldier, if he had better means of cooking? Certainly, if the soldiers had the means of roasting, baking, and frying their meat. Independently of the diversity of diet, which I am very much in favour of, I am sure it would be much more tasteful to the soldier.

* * * * *

3073. Mr. Stafford: How would you improve the cooking? I should give them the means of baking, the means of roasting, and the means of frying; they should have roasting grates, ovens, and frying-pans. I should have in every barracks a sort of small *batterie*, so that the men might have stew-holes, and fry upon them—the same as they do in the French army.

3074. Would that add very much to the expense? No; very little.

3075. Would you not gain it in the fuel? Yes; they have them in the French barracks, and the men are using their stew-pans all day long; they make stews—they stew vegetables—and improve their diet, and diversify it very much.

3076. If you give them this increased ration, you must have an increased stoppage, must you not? Not actually

out of the soldier's pocket—perhaps less than he now pays. At present it is done by messes. One man from the mess goes out with a non-commissioned officer with the men's mess money, which generally amounts to from about $2\frac{1}{2}$ d. to 3d. a day in excess of what he pays for his regular ration; they go out and purchase their coffee, sugar, pepper, salt, potatoes, or anything else they can get.

3077. Is that compulsory upon them? Yes; that is, the commanding officer is allowed to expend a certain sum upon the dieting of his men, and he apportions that as he chooses.

3078. It is not to exceed a certain sum? No.

3079. 7d. or 8d.? It comes generally to $8\frac{1}{2}$ d. a day.

3080. Including washing? Yes; one halfpenny is allowed for that. The Guards pay more, as they have extra clothes.

3081. You conceive that an ample ration for three meals, with variety, would not cost the soldier more than he is now compelled to pay in the stoppage for his ration and the stoppage for his additional messing? Certainly not.

* * * * *

3158. Sir H. K. Storks: The lavatories are very bad in the barracks, are they not? Very bad indeed.

3159. President: They have urine-tubs in the barrack-room, and they are very offensive, are they not? Very bad.

3160. Sir H. K. Storks: What means have the men of making water at night? They have urine-tubs.

3161. Do you recollect an order being issued, calling the attention of the commanding officers to men washing themselves in the urine-tubs? It was the general practice throughout the army; they had no other means.

3162. Since when ? Since I have been in the Army.

3163. President : What are those urine-tubs made of ?
Of wood.

3164. Do not they necessarily stink ? Most offensively.

3165. Why do they not give them chamber-pots ? It is not one of the barrack utensils ; it is not barrack furniture. There will be no difficulty in having the same pewter chamber-pots as they have in the hospitals. I think that every barrack ought to be provided with proper utensils.

3166. Mr. Alexander : The privies are nothing more than cesspools ? They are abominable, and extremely offensive. The system was to empty them by contract ; but latterly it is improved very much indeed, because it is all bought for manure.

Is it to be wondered at that soldiers died under these defective arrangements at more than twice the rate due to life under more healthy conditions ?

In all new barracks there are improved latrines for the men, proper urinals for both day and night uses, and water-closets for the officers. Barracks and hospitals, both in Great Britain and abroad, have been improved ; but in certain cases new barracks and new hospitals on fresh sites are required, as safe and satisfactory improvements are not always possible,—as, for instance, in Dublin. The excuse for not building new barracks is a plea of cost. If, however, an estimate were put forward, and were vigorously supported with truthful and legitimate reasons, showing that sickness would be lessened, and deaths reduced to an extent producing both a direct and indirect

saving of money, more than an equivalent to the interest on the capital expended, I think the most rigid economist in the House of Commons would give way.

Since the Crimean War great improvements have been made in Army Hygiene,—as, in improved hospitals, in improved ambulance arrangements, and in sanitation generally.

Enormous improvements have also been made in British India, and at all stations within the tropics,—as, in the West Indian Islands, at Singapore, and at Hong Kong.

Her Majesty the Queen has also established the Royal Red Cross decoration, so that sanitary nursing service will become popular.

Miss Florence Nightingale has published her “Notes on Hospital Construction,” and “Notes on Nursing,” which will prevent the mistakes and mal-arrangements of former periods,—as, hospitals on the PAVILION PLAN, which she advocates, will alone be erected in the future: and, where space can be obtained, only of one story in height, so as to secure both window and roof-ridge ventilation.

To show that the work of the British Army Sanitary Commissioners has met with approval at home and abroad, and also with imitation in America, the following extracts are given from the “History of the United States Sanitary Commission,” from Kinglake’s “History of the Invasion of the Crimea,” and also from a paper by J. N. Radcliffe, M.R.C.S.:—

Copy of a Letter from the UNITED STATES SANITARY
COMMISSION :—

“ HISTORICAL BUREAU, 21, WEST TWELFTH STREET,
“ NEW YORK, *March 27, 1867.*

“ MY DEAR SIR,—I have the pleasure to transmit herewith a copy of the ‘History of the United States Sanitary Commission: being the General Report of its Work during the War of the Rebellion’; and beg to ask your acceptance of the same in the name of the Commission and in recognition of your claim upon our grateful regard as a distinguished friend of our National cause.

“ With assurances of the highest esteem,—I am, dear Sir, very truly your obedient servant,

(Signed) “ JNO. S. BLATCHFORD,
“ *General Secretary.*

“ ROBERT RAWLINSON, C.E., Government Act Office,
“ No. 8, Richmond Terrace, Whitehall, London, England.”

*Extract from the HISTORY OF THE UNITED STATES
SANITARY COMMISSION: BEING THE GENERAL
REPORT OF ITS WORK DURING THE WAR OF
THE REBELLION. By CHARLES J. STILLÉ. Pages 26 to 33.
Published by J. B. Lippincott & Co., Philadelphia, 1866.*

The American Government had no official Army Sanitary Commission when the war commenced. Neither, indeed, did the Government ever establish such a commission, but after the disastrous battle of Bull-run a Civil Sanitary Commission was formed, as may be seen, on the lines of the British Army Sanitary Commission, and was supported throughout by voluntary subscriptions to the extent of millions of pounds sterling.

*Abstract from the Report by the Secretaries to the Civil Sanitary
Commission.*

The President (Lincoln) and General (Scott) had repudiated the idea of an official Army Sanitary Commission, which repudiation brought the Civil Sanitary Commission into existence.

“ This strange infatuation pervaded all ranks of the people; and as it seemed a foregone conclusion that discipline, Apprehensions felt for the result. such as that which existed in other armies, could not be enforced in ours, of course little effort was made to introduce it among the volunteers. The effect of this absurd theory soon became apparent. The ignorance of the officers concerning their duties was manifest at the very first test. The injury to the health of the troops, and therefore to their morale and efficiency, mainly due to the ignorance, incompetency, and carelessness of their officers on their arrival at Washington, is now known to have been absolutely disastrous. Experienced military officers looked with dismay on the prospect of making an active campaign with such troops, while those who were more sanguine, only because they were more ignorant, could not fail to be oppressed with an anxious fear lest the best strength of the nation should be uselessly sacrificed. But before the actual shock of arms took place, leading minds throughout the country, who saw most

clearly the deep-seated cause of the evil, were thoroughly studying the whole subject, and anxiously searching for a remedy.

“ At that time the experience of the Crimean War was fresh in the memory of all. That experience was a complete chapter by Experience itself on sanitary science. It taught the great truth that of the Crimean the ‘ cause of humanity was identified with the strength War. of armies.’ We were left to no vague conjecture as to the causes which produced the fearful mortality among the allied troops before Sebastopol—a mortality which, as has been truly said, has never been equalled since the hosts of Sennacherib fell in a single night. Public opinion in England, indignant and horror-stricken at this frightful result, long before the war closed, called loudly for investigation and remedy. The result has been a contribution of inestimable value to our knowledge of everything which concerns the vital questions of the health, comfort, and efficiency of armies. The results of these investigations, both in regard to the causes of the evil and the wonderful efficiency of the remedies which were applied for its removal, had been recently given to the world in Parliamentary reports, in the works of professional men, and especially in the invaluable testimony of Miss Nightingale ; so that all the conditions of the problem were perfectly known, and its solution could be arrived at with the exactness and certainty of a scientific demonstration. The description of the causes which had produced a mortality in the British army so fearful that, had it continued at the rate which was maintained in January, 1855, it would in ten months have destroyed every man in it, was so accurate, and bore so wonderful a resemblance to evils already known to exist in our condition, that the lesson seemed prepared specially for our warning and benefit. Earnest men who loved their country, and who had some humane consideration for the health and lives of those who were defending it, determined that something should be done to avoid a similar catastrophe here. They knew that the British people had been able only to investigate and deplore the causes which had led to so direful a result. They felt that here a wise, thorough, and persistent effort should be made at the outset of the war, guided by the Crimean experience, to forestal the insidious march of those diseases which, if unchecked, would inevitably overwhelm our army and, with it, our country in ruin.

“ The experience of the Crimean War taught those who consulted it the nature of the terrible dangers which encompass all armies outside of the battle-field, the possibility of mitigating them, and the sanitary measures which, in strict accordance with the general laws of health, should be adopted to provide for the safety of an army. But it taught many other things, which were far from encouraging to the zeal of those who suppose that the ease of applying a remedy has in actual practice any due relation to the undisputed magnitude of the evil to be abated. They found, in the first place, a certain inflexible military routine in the management of everything connected with the administration of the Medical Department of an army, the preservation of which in all its integrity was considered as essential to the very existence of the troops who might be perishing through its adherence to regulation and precedent, as any part of the military system. They found, too, that the medical staff, however much it might deplore the evil, was helpless to effect a remedy, for under the existing system it had no power to initiate, order, and execute sanitary works. While the evidence was overwhelming that the plainest teachings of modern science had been neglected, not only in the construction of hospitals, but in the adoption of suitable precautionary measures to insure the health and comfort of the soldier in camp, it was also evident that the natural jealousy which is the result of a certain *esprit de corps* in any thoroughly organised administrative body, always manifests itself with a most determined spirit against any plans which seek to infuse new life into that body even through the regular channels, and especially against any extra official effort to render its machinery less cumbrous and more efficient. While the experience of the Crimea, therefore, clearly proved the cause of the evil and the nature of the remedy, it no less clearly proved the practical difficulty of applying that remedy outside and independent of Government agencies, and the almost insurmountable obstacles of transferring to such agencies a portion of that zeal and enthusiasm for the welfare of the soldier which, in modern times at least, to the credit of the civilisation of the age let it be said, is the strongest and most characteristic impulse of the people towards an army which is fighting its battles. Still, the success of Miss Nightingale’s efforts in the hospitals at Scutari, and the astonishing results which were produced in the improve-

ment of the health of the troops by the adoption of the measures recommended and enforced by the Government Sanitary Commission which was sent out to the Crimea in February, 1855, led those to persevere who clearly saw the nature of the difficult task before them. Thus encouraged, they sought to initiate some methods which should anticipate and guard against, and not follow, as in the Crimea, the fearful havoc caused by the neglect of sanitary laws.

“The importance, therefore, of rousing public opinion to the absolute necessity of forcing upon the Government the adoption of precautionary measures to insure the lives and safety of our troops in camps, in barracks, and in hospitals, was the practical lesson which was taught by the Crimean experience to those who had studied it with a view of rendering it applicable to our needs. Some of these earnest-minded men became afterwards active members of the United States Sanitary Commission, but that organisation bore no resemblance whatever, except in name, to the body which was sent out by the British Government in February, 1855. The latter was invested with plenary powers to do anything and everything which could improve the sanitary condition of the troops, whether in the camps or the hospitals. It will appear hereafter that our Sanitary Commission in its organisation, methods, operations, and results, was wholly original and peculiarly American in its characteristics. The occasion of its existence was, unquestionably, an emergency which might prove, and did prove in many respects, similar to that which occurred in the Crimean War, but that war only taught the necessity of precautionary measures, and shed no light whatever upon the practical question how far it was possible to adapt those measures to our American system. Indeed, it will be seen, as we proceed, how our peculiar condition and circumstances embarrassed the action of those among us who sought to base the care of our army upon a system deduced from the positive results of experience. It will, perhaps, be found that it was almost as difficult to make our Government believe in the necessity of taking such precautionary measures as it became afterwards to convince those whose immediate duty it was to enforce them, that supplemental

The influence of such teachings in favour of similar measures here.

aid and the advice of an unofficial organisation might be so given as not to impair military efficiency and discipline.

“The powers conferred on the British Sanitary Commission were wholly unexampled in the history of the administrative system of Great Britain. The results of its labours have been, on the whole, perhaps the grandest contribution ever made by science to the practical art of preserving health among men required to live together in large masses. Its existence was due, as we have said, to the horror which was inspired by the accounts of the perishing army before Sebastopol, and to the wide-spread conviction that this result was attributable to causes which might be removed by wise sanitary measures. Three gentlemen, each distinguished for his practical acquaintance with the laws of hygiene and the principles of sanitary science—Dr. Sutherland, Dr. Hector Gavin, and Mr. Rawlinson—were appointed in February, 1855, by the Minister of War, Lord Panmure, Commissioners to proceed at once to the Crimea (subsequently, on the death of Dr. Gavin, Dr. Milroy was appointed), and there, on the spot, to reform the abuses to which the evil was due. They were told expressly, in the letter which announced their appointment and defined their duties, that in the prosecution of their labours they were not to be content with merely issuing an order, but that ‘they should see instantly that the work they ordered was commenced, and superintend it day by day until it was finished. They were further directed to use all diligence in ascertaining whether any and what removable causes of disease connected with the camps and hospitals existed, to represent such defects to the military and naval authorities, to issue instructions for their removal, and to see that their instructions were complied with.’ Thus it will be seen that, in all matters within the scope of their instructions, they were supreme, overriding all considerations of rank, and introducing for the first time into the English system the practical heresy of breaking through all the solemn formalities of regulation, precedent, and red-tape, upon the strict observance of which the safety of the country—to the mind trained in official habits—absolutely depends. The result justified this extraordinary—almost revolutionary—departure from the ordinary methods of administration; the rescue of thousands from impending death will be its justification in history, while perhaps the stoutest

defender of routine and precedent will now admit that this was one of the emergencies of that necessity which knows no law. No such extraordinary powers as were conferred upon these Commissioners, and fully exercised by them when it was necessary to accomplish their object, were ever granted by the Government of the United States to any body of men outside of the regular military organisation; but perhaps, many will recall periods during the war when such a despotic authority, wisely exercised by such a Commission as that sent to the Crimea, would have saved thousands of lives to the country and millions of dollars to its treasury."

*Extract from "THE INVASION OF THE CRIMEA," by
A. W. KINGLAKE. Pages 440 to 449.*

"WITH the same righteous object at heart, and at nearly the very same time,* our males also passed into action; but how did their brain-power work? They formed and sent out a Commission to inquire into the then existing 'conditions and wants' of our sick and wounded troops in the East, and also into the 'hospital accommodation' provided for them, and into the adequacy of such accommodation for subsequent 'contingencies'; and they were to carry their investigations to the point of attaining 'the full and complete truth,' and enabling themselves to present to the War Minister 'the most comprehensive Report, and the most desirable suggestions,' 'with a view to the correction of any deficiencies which might exist or arise in the conduct of the hospital establishments,' or generally in the measures adopted for the care of our troops, sick or wounded. After conducting inquiries which, for intricacy and probable tediousness, might rival whole clusters of old-fashioned Chancery suits, the Commission was to report home to

* The latter end of October. It was then that the ladies sailed, and then—the 23rd—that the males took their step.

the Duke of Newcastle;* and in completing instructions which ensured such a loss of time as to make discomfiture certain, our male rulers ordered their tortoise to gallop as fast as it could. They gravely enjoined despatch.

“The inquiries directed were such as might well enough occupy a good number of months, if not, indeed, one or two years; but supposing them by some magic vigour to be finished within a few weeks, how soon did any male hope that they could be brought to result in that actual ‘correction of deficiencies’ which, of course, was the object in view? The hospitals were many, and some of them were divided from others by hundreds of miles of sea. Each one of them, however imperfect, was still a complex organism; and although its faults might be glaring, the cause of them might well be obscure, whilst besides, over every step that led towards improvement, there always impended the danger of exciting antagonism in the minds of public servants who, when disturbed in their work by this ugly search after faults, might easily throw up defences obstructive to prompt reformation; and, upon the whole, it was scarcely imaginable that Commissioners reaching the Bosphorus in the first week of November would be able to complete their inquiry and make their report before the middle of the following month.

“Allowing from that time one fortnight for the mail to take home the report, another for deliberation in Whitehall and the construction of remedial plans, another for the eastward-bound mail bringing out the decrees of the Government, with—superadded at last—yet one other fortnight for carrying them into effect, we find interposed for preparations a period of some thirteen weeks—that is, a quarter of a year—and the time of expected fulfilment stands—not, as was bitterly needed, before the beginning of winter, but almost, indeed, at its close, so that any of our soldiery stricken in the direst time of trial, who were only to be saved through the measures advised by the Commission, would

* “Oh, good gracious! How like ‘them!’” If remembering and admiring, as I do, Mrs. Oliphant’s delightful “Chronicles of Carlingford,” one can almost hear some such comment on the masculine “them” from the lips of her charming Miss Majoribanks.

then be at rest in their graves. But, in truth, no such speed as this computation implies could well have been realised ; and few will gainsay the tribunal which described this Commission as a 'form of proceeding suited to redress grievances at home, or to become a basis for legislative measures,' but 'ill adapted to relieve the pressing wants of 5,000 men suffering under mismanagement and neglect.'*

" The Commissioners were at their post in good time † ; and, though hampered for a while by an error on the part of the Government,‡ they conducted the inquiry as quickly as they very well could without neglecting their orders, and came also, on the whole, to conclusions which appear sound enough in themselves ; but how was it possible that, whilst acting under instructions which compelled them to report to the War Department at home, they could promptly effect any good ? Mr. Sidney Herbert, seeing this, and acting, unless I mistake, under the impulsion of his letters from the Lady-in-Chief, took upon himself to suggest in a private letter that, without waiting for the approval of their report, the Commissioners should themselves see 'the evil corrected as far as possible,' but their actual instructions at that time allowed them no manner of warrant for taking any such course ; and it was only on the 6th of January, 1855, that the Government enjoined the Commissioners to make suggestions to Lord William Paulet.

" Receiving that warrant on either the 22nd or 23rd of January, they so far obeyed it as to make some recommendations to Lord William Paulet on the 26th, and some more on a later day ; but these pointed to what may be called the command and disposition of troops in connexion with our Scutari hospitals, and did not

* The Sebastopol Committee Rep., pp. 5, 7.

† The first week of November, 1854. The Commission at first consisted of Dr. Cumming, Dr. Spence, and Mr. Maxwell.

‡ The Government detached Dr. Spence on a mission to the Crimea without providing that his two colleagues might act as a "quorum," and the powers of the Commission were thus thrown into abeyance. Dr. Spence being on board the *Prince*, off Balaklava, on the 14th of November there lost his life, and Dr. Sidney Laing was appointed to fill his place. The Commission recovered its competency on the 27th of November.

embrace the main subject.* The Commissioners (as expressly directed) addressed their report,—not to any authority on the spot, but—to our War Department in London. It was at Scutari on the 23rd of February † that they made their report, and it probably reached Whitehall about the 9th of the following month, so that Ministers in the second week of March might at last undertake to found beliefs or opinions upon the knowledge obtained, might frame their measures accordingly, might send out their decrees to the East, and perhaps hope to see them beginning to take some effect in the middle or latter part of the spring,—a time later by three or four months than that at which Sir George Browne saw perfection in our hospital wards, and ascribed it to womanly energies.

“Thus sorrily lagged the males in their undesigned trial of speed and power with what proved not only the swifter, not only the more agile mind, but also the higher capacity for executive business, and even the more intent will.

“If regarded as only concerning the internal administration of the Scutari hospitals, this apparent approach to perfection was thoroughly real, and already, as some would imagine, must have carried the reward of success to the heart of the Lady-in-Chief. She herself, however, was one who disdained to look with complacency upon any result of her efforts which imported no real gain of ground, and would hardly, indeed, acknowledge that from November even to February substantial good had been done, when, in spite of all the care lavished, and concurrently with the admiration excited by an almost magic improvement in the efficiency of the hospital management, stern columns of figures showed death to be more than ever rife in the wards.

The mortality
in our hospitals
not yet, how-
ever, forced
down.

* The principal change recommended to Lord William by the Commissioners had been previously submitted to Lord Raglan himself by the Lady-in-Chief.

† Even then they had not had time enough to complete the whole inquiry directed, but the Government pressed them to end their task, because one of them (Dr. Cumming) had become the chief medical officer at Scutari, and his services were there greatly needed.

V.

"Brought about, as we saw, by those wholesale, encompassing poisons which were only to be conquered by engineers and labourers undertaking what we call 'Public Works,' the mortality in our Bosphorus hospitals maintained its appalling height throughout the whole winter, and continued its ravages into the month of March.*

"Science then interposed. Taught at last by observing the The Sanitary impotence of orders framed by a Minister who forgot Commissioners. to count Time in his reckoning,† the Government—now newly constituted—took care to avoid his mistake; and, having wisely determined that they would attack the foul poisons surrounding our Levantine hospitals with the weapons of the skilled engineer, they resolved that the Sanitary Commissioners despatched for this purpose should—not merely go inquiring, but—act, and should not only act, but be prompt. Urged by orders conceived in this spirit, the Commissioners, Dr. Sutherland, Dr. H. Gavin, and Mr. Rawlinson, went off to the East without seemingly losing a day.

"They soon found that our Levantine hospitals were suffering under rank poison—not poison of such a kind that it can be annulled or counteracted by domestic management, but of that grosser sort that can only be combated by engineering works; and propelled by wholesome instructions which ordered them 'to see instantly' to the commencement of the necessary work, and to its superintendence 'day by day until finished,'‡ they

* See *ante*, p. 214.

† The instructions to the Hospital Commissioners stated, *ante*, p. 441.

‡ These instructions, given by the War Department on the 19th of February, 1855, were so well devised, and produced such signal effect, that they deserve to be carefully remembered by our army administrators; and, if I do not find room for them in the Appendix, I trust that the above-given date may be used as a clue for finding them in the official archives. The tone of the instructions is very peculiar, and such as to make one believe that, whether directly or otherwise—perhaps through the wholesome intervention of Mr. Sidney Herbert—they owed much to feminine impulsion. The diction of the orders is such that, in house-keepers' language, it may be said to have "bustled the servants."

passed into action with admirable promptitude. In the second week of March they had already made some progress, and on the 17th had advanced their works so far as to be in a state for producing at once some part of the intended effects. Then came
 The change on a change which, if only it had been preceded by
 they wrought. mummery, instead of ventilation and drainage and
 pure water supply, would have easily passed for a miracle.*
 Down went the rate of mortality. Having already gone down
 from the terrible February rate of 42 per cent. to 31, it descended
 in the next fortnight to 14; in the next twenty days to 10; in
 the next, to 5; in the next, to 4; and, finally, in the next twenty
 days,—days ending on the 30th of June, 1855,—to scarce more
 than 2,†—a rate so low as to be touching the very goal for which
 sanguine toilers were striving, because brought down to a level
 with the rate of mortality in our military hospitals at home.‡

“And now, passing from the mortality in our Bosphorus hospitals to that of our Eastern hospitals generally, I may say that the deaths were—for January, 1855, 3,168; for February, 2,523; for March, 1,409; for April, 582; for May, 594; and for June, 1,042;§ but, besides, if consenting once more to glance beyond the bounds of this History, I may say that from the end of June, 1855, to the time, twelve months later, when our army bade farewell to Crim Tartary, the mortality invading our hospitals grew less and less almost constantly, and that the monthly return, which for January,

* When afterwards he went to the Crimea, Mr. Rawlinson, the engineering member of the Commission, who had achieved such vast good, had himself a sort of escape which popular diction is still apt to call “miraculous.” He was struck by a 42-pounder steel shot, without being permanently, or indeed, very seriously, injured.

† *Ibid.* Stated more exactly with their appendant fractions, the above numbers are 42·7, 31·5, 14·4, 10·7, 5·2, 4·3, and 2·2.

‡ That is, with the average rate in such of them as were in or near London. In those, it seems, the average rate of mortality was 2·9 per cent.

§ Being deaths to force per 1,000 per annum :—

For January, 1855.....	1173·6	For April, 1855	22·32
„ February, „	9792·	„ May, „	202·8
„ March, „	561·6	„ June, „	318·

1855, had recorded 3,168 deaths, showed for June, in the following year, deaths numbering only six.*

“But, whilst dwelling on those happy changes which raised our hospital management to an almost unknown height of excellence, it less becomes our people to harbour a sense of complacency than to think of the lives—the lost lives—that timely care might have saved. A sustained though painful remembrance of those trials, those wants, under which our troops suffered and died, would, perhaps, afford some ground for hoping that, in wars yet to come, the dire penalties of State incapacity may not again have to be borne.

Thoughts that
memory ought
not to shun.

VI.

“Nor ought our people to fly from the memory of this winter campaign without bending their thoughts to some problems which tasked men’s minds at the time, and have only in part found solution. The still unsolved problems are many, yet fuse well enough into one : How to make our mixed polity furnish an Executive Government which at once, on the call to arms, and without needing yet further lessons in the cruel school of adversity, may be equal to the business of war.”

Extract from “The Hygiene of the Turkish Army,” 1854–55. By J. N. RADCLIFFE, M.R.C.S. Eng., Late of the Staff of H.H. Omar Pasha.

THE cleanliness of a camp is a subject of peculiar importance, and the methods of attaining cleanliness merit more attention than they have yet received on the part of military officers.

* *Ibid.* The ratio of these six deaths “to force per 1,000 per annum” is expressed by the figures which we before saw expressing the ratio for June, 1856 (see note, *ante*, p. 406), *i.e.*, by the figures 2·4.

Cleanliness, so far as the neat aspect of a camp is concerned, is highly gratifying to the eye ; but this may be, and, indeed, often is, attained, and yet some of the worst sources of atmospheric pollution, from a misapprehension of their effects, are allowed to remain.

The continued inhalation of an atmosphere tainted by decomposing organic matter, such as is usually rife in a camp, is one of the most powerful predisposing causes of those terrible epidemics which ravage armies. It insidiously deteriorates the health, and lays the foundation necessary for the development of fever, cholera, and other cognate diseases ; and inasmuch as it is less palpable in its effects than bad diet, excessive fatigue, intemperance, and other potent predisposing causes of disease, which are apt to affect an army in the field, and as it is more generally, nay, is invariably, present in a greater or less degree, it requires more constant and watchful attention. Remove the predisposing causes of an epidemic disease, and the exciting causes become, as a rule, inoperative ; diminish the former in degree, and the latter will be proportionately diminished in effect. For many years the experience of civil life has shown that the emanations from decomposing substances act most powerfully in predisposing the system to the development of fever, dysentery, diarrhoea, and cholera. The experience of the allied armies during the war in the Crimea has shown that, in the camp, the effluvia from putrescent matters were equally powerful agents in the development of diseases among the soldiers, and that the diseases thus developed were similar in character to those witnessed under the same circumstances in civil life.

To diminish the sources of atmospheric vitiation in a camp, it is requisite that proper receptacles should be provided for all ejected matters whatsoever ; that it should be imperative upon the soldier to use these receptacles ; that measures should be had recourse to for the destruction of such rejected matters as cannot be readily and deeply buried ; that a systematic watchfulness should be observed on the part of the officers ; and that special regulations should be adopted for the general guidance of the men. Nothing can be done effectually without a properly-organised scheme of action, equally affecting the superior and inferior grades of officers, and the men. The sanitary state of a camp is a matter of

too great importance to admit of the measures necessary to secure the conditions most favourable to the preservation of health being left to the option of one man or another.

Not unfrequently the site of an encampment was insufficiently prepared, the drainage in particular being defective ; and when the soil happened to be naturally moist, the air within the tents was rendered damp, and this condition operated as a powerful localising cause of zymotic disease.

Notwithstanding the want of any definite or special hygienic laws in the British army in the Crimea, the general good sense both of officers and men led to an avoidance of all the more glaring sources of filth, and to an adoption of measures of cleanliness which were characteristic. Even so early as the month of April, 1855, when the men had barely been relieved from the harassing and incessant duties which had devolved upon them during the winter, the nose at once pointed out the distinction between the French and Turkish and the English camps, the atmosphere in the two former camps abounding with pernicious effluvia ; and, subsequently, the Sardinian camp might equally be distinguished from the British camp by a superfluity of foul odours. In none of the allied camps were the essentials of cleanliness attended to so much as in the British camp.

The Sardinian soldiers equalled, if they did not exceed, the Turks in the filthiness of their habits ; and the polluted condition of the outskirts of their encampments, and even of the immediate vicinity of their hospitals, was astounding. Moreover, there was a neglect in the removal or burial of carrion within the bounds of the French, Sardinian, and Turkish camps, which was never witnessed in the British camp.

Each of the allied armies suffered more or less from the neglect of hygienic measures.*

* The British Army Sanitary Commissioners landed in the Crimea in April, 1855, and took up quarters in Balaklava (temporary huts of timber). The day after landing,—in company with General Sir Colin Campbell,—the camp of the Highland Brigade was inspected, where much fever existed. Some temporary huts then occupied were partially buried in the hill-side, which was wet shale. The roofs of

In the spring, summer, and autumn of 1855, fever and scurvy prevailed extensively among the Turkish troops at Eupatoria, in consequence of the foul hygienic condition of the town and entrenched camp, and the imperfect rations of the soldiers. During the same period the sick rate of the Turkish force before Sebastopol was comparatively low, the camp being rarely fixed for more than six or eight weeks upon one spot, and the men being fully fed; but zymotic diseases, particularly fever, diarrhoea, and cholera, constituted the principal portion of the sickness which occurred, and attention to the most ordinary hygienic precautions would have diminished the amount of those diseases.

The sanitary state of the French Camp and army during the winter of 1855-56 formed one of the saddest episodes of the war. "The earth within and without the dwelling-places of the men was saturated with the products of human and bestial bodies buried lightly. Throughout the winter, carcasses were left to rot uncovered close to the tents, while soldiers in huts and tents

the huts were of felt, but water and air tight,—no provision existing for ventilation. The floors were not only damp, but from below most of the huts water oozed out,—the subsoil being as foul as a cesspit. The causes of the fever were consequently soon made evident to the General. A plan for freeing the huts from the subsoil wet by clearance round the huts and by drains, with full ridge ventilation by a louvre opening the length of the ridge, and by removing the inside subsoil for a depth of 12 inches, and substituting quicklime and charcoal, soon rendered the huts operated upon wholesome. As many of the men as it was possible to remove to a site on dry rock higher up were so removed, the result being a cessation of new fever cases, and recovery of the sick.

As rapidly as possible the Commissioners reported to Lord Raglan on the condition of the village and harbour of Balaklava, the cavalry camp, and the camps of the divisions at the front generally; embodying suggestions for the formation of latrines, the draining and ridge ventilation of the huts, and the disinfection of the subsoil within them. We had reason to know that Lord Raglan must have had the recommendation as to scavenging, cleansing, and improving the means of water-supply copied during the night, as we found the works actually commenced the next morning. Mr. Radcliffe apparently did not know this. He, however, saw that the British portion of the camp soon put on an improved appearance, and that this improvement was continued up to the end. The Commissioners laid down this rule,—namely, that scavenging and surface cleansing should not cease so long as troops occupied the ground. The huts, also, once ventilated, remained ventilated to the end of the war.—R. R.

closely shut against fresh air, constantly wet, the enclosed area sank, and loaded with all sorts of impurities. Personal cleanliness was impracticable in such habitations, and the *alentours* showed an utter disregard of all English notions of decency. To these local evils must be added the too close packing of huts and tents, both for the healthy and sick.* The tents, also, were old and much worn; the food of the soldiers was, and had been for some months, scanty and unwholesome; the supply of wood for fuel was deficient; and the clothing was bad, and not fitted for winter.

Developed and fostered by these conditions, and by the neglect of even the commonest hygienic rules, sickness prevailed to so great an extent in the French army, that it was placed in a very critical position. At one time the aggregate number of sick amounted to 40,000. Typhus raged in the camp and hospitals with the virulence of a pestilence, and the mortality was enormous. M. Baudens declared that, of the typhus patients in hospital in February, 1856, two-thirds were devoted to certain death. Forty-six surgeons died from typhus alone, and scarcely one escaped an attack of the disease. The medical staff became so crippled by its losses, that it was unable to meet the exigencies of the period; and on the Minister of War being urged to send out as many surgeons as possible, he declared that he had no more surgeons at his disposal, and that he could not procure any,—“Il n’en avait plus à sa disposition, et le recrutement ne répondait pas aux besoins.”—(Baudens.) The French hospitals in the Crimea and on the Bosphorus were insufficient for the fitting accommodation of the immense amount of sickness which inundated them; and while the French camp in the Crimea paralleled the horrible scenes which occurred in the British camp during the first winter of 1854-54, the French hospitals on the Bosphorus paralleled the wretchedness, misery, neglect, and mortality which reigned in our hospitals at Scutari during the same period.†

Inordinate fatigue had contributed greatly to the excess of sickness which prevailed among the British troops in the winter of

* “England and France before Sebastopol, looked at from a Medical Point of View.” By Charles Bryce, M.D. London, 1857. Page 84.

† Dr. Bryce, *Op. cit. passim*.

1854-55, but this important source of disease had little or no influence in the development of the maladies which ravaged the French army in the winter of 1855-56; for the duties of the French soldiers at that period did not exceed in severity those performed by the British soldiers, and the health of the latter was good. The position which was occupied by the French army was also almost inoperative in the causation of zymotic diseases; for the experience of the army, in the earlier part of the campaign, had shown that, with the exception of that portion of the position which was on the Tchernaya, the ground over which the camp extended was healthy; and the divisions of the French army which were encamped on the plateau of Sebastopol suffered equally from disease with the rest of the army, although the British divisions encamped on the same plateau had good health.

The causes of the extraordinary amount of sickness and excessive mortality which prevailed in the French army are to be found alone in the foul sanitary condition of the camp and the miserable state of the half-fed soldiers. The typhus epidemic was nursed and disseminated by the over-crowded and filthy hospitals; every hospital was a centre of infection, and in the camp "typhus overflowed the hospitals, and was found in the regimental tents" (Baudens).

The Sardinian army did not escape the baneful consequences of a polluted camp, but the extensive hospital accommodation provided, and the completeness of the medical staff, sufficed to keep the outbreaks of zymotic disease which occurred more or less in subjection, or to nip them in the bud.

The care devoted to the removal of noxious agents in the British camp had considerable influence in causing that high state of health and freedom from disease which prevailed among our troops towards the close of the war; but, when the sanitary state of our army was at the best (May, 1856), and the sick-rate averaged only 5 per cent. of the whole force, 25 per cent. of the total admissions into hospital and 37 per cent. of the deaths were from zymotic disease. In May, 1855, zymotic affections constituted 64 per cent. of the cases of sickness admitted into hospital, and occasioned 90 per cent. of the deaths from disease; but, notwithstanding the great diminution in the amount both of the

sickness and mortality from zymotic disease in May, 1856, the Sanitary Commission despatched to the seat of war in the Crimea has expressed the opinion that, most probably, "a still further diminution of zymotic cases might have been obtained" had sanitary measures been more thoroughly and systematically carried out in the camp, and the drinking of ardent spirits greatly diminished, if not prevented.*

During the twelve months preceding the evacuation of the Crimea the average proportion of zymotic disease to the total sick of the British army, exclusive of wounded, was rather more than 49 per cent., and the average proportion of deaths from zymotic disease to the total mortality from sickness was 51 per cent. From October 1, 1854, to April 30, 1855, fevers, cholera, and scurvy formed one-third, and diseases of the stomach and bowels one-half of the total admissions into hospital, exclusive of wounded. It may be roughly estimated that zymotic diseases constituted two-thirds of the cases of sickness admitted into hospital during that period.

This testimony of Mr. J. M. Radcliffe to the superior condition of the British Army, both in hospital, in the Bosphorus, and in camp in the Crimea, has an independent value, which may be set against opinions expressed by some of the Army Medical Officers, who would not acknowledge any merit in the work done by and under the orders of the Army Sanitary Commission, although the results before them were so palpable.

The statements set forth in this paper may therefore again

* Report of the Proceedings of the Sanitary Commission despatched to the Seat of War in the East. Blue Book, p. 196.

be reiterated, namely, that the works as described to have been executed for the British Army at the hospitals on the Bosphorus and in the Crimea were exceptional, and were not imitated by any of the other army authorities. The deadly effects of the foul sewers and drains found to exist at the large Turkish buildings occupied by British soldiers and sailors were entirely removed; the barrack and hospital rooms occupied by the sick had almost immediately the fullest possible means for ventilation provided; the change of air amounting to millions of cubic feet each hour of each day; the sick had, in fact, during the summer as much fresh air to breathe in the wards as if they had been in the open air, but protected from direct drafts; the sewers and drains were incessantly flushed; the wards were cleansed and lime-washed, which processes were continuous to the end, and removal of surface refuse of all sorts was equally continuous, with the most ample and perfect scavenging. The Commissioners paid strict attention to their instructions, obeying them both in the letter and in the spirit. General Lord William Paulet at first, and General Storks subsequently, both seconded the efforts of the Commissioners to the fullest possible extent.

It formed no part of our duty to interfere with the buildings occupied on the Bosphorus by the French, and if any members of the French army, military or medical, ever inspected the works done by the British Sanitary Commissioners to the buildings occupied by the British, it never came to our knowledge. It, however, is clear from the statements made by Mr. J. N. Radcliffe that no such inspection, leading to any practical purpose, ever was made by the French, by the Sardinians, or by the Turks.

The voluminous evidence taken by the Commission presided over by Lord Morley as to the results of the

Egyptian campaign is not pleasant reading. Hospital orderlies were in some instances brutal (almost as bad as those described in "The Surgeon's Daughter"), and in many instances they were apathetic and careless. If the evidence of General Lord Wolseley stood alone it would be the severest condemnation possible of the defective sanitary organisation and arrangements; but this evidence is not exceptional. All the old Crimean blunders appear to have been repeated. Medical and other stores could not be obtained when needed, provisions ran short, and the cooking was abominable. The camping-grounds occupied were swampy and offensively dirty. Egyptian buildings were used as hospitals, without alteration, cleansing, or ventilation. The results being, as usual under such conditions, disease in excess,—7,039 men in hospital, 463 only being surgical cases. The work of the Sanitary Commission in the Crimea, and the results obtained, formed no precedent for the Army Medical Department in Egypt. The regulations, as established by Lord Herbert, had been subverted. The climate was blamed,—a climate to which invalids are ordered to recover health.

Is it too much to hope that the Government may in time recognise the necessity for a Sanitary Department,—independent of the doctors? A department having a sanitary engineer at its head, with a staff of sanitary inspectors under him. This Sanitary Department to be immediately under the orders of the Commander-in-Chief for the time being, who shall have power to strengthen the service as needed. The engineer to see to all structural works and arrangements. The sanitary inspectors to be placed at the head of a scavenging department, and to assist with supplies of water. Where outside labour can be obtained this to be

made available, and day by day, or week by week, be paid for. If there had been a sanitary engineer with the army in Egypt he would at once have removed the windows from any buildings occupied as hospitals, so as to have secured full means for ventilation ; would have cleansed the wards or rooms ; would also have had lime-washing where practicable ; have seen to any sewers or drains, where such existed ; and have made provision for water-filtering. These duties form no part of the education of a medical officer, and it is better they should not do so. A sanitary engineer undertaking surgical operations would not be more out of place than a medical officer presuming to undertake and execute sanitary engineering works.

A long experience with the devising and executing of sanitary works has led me to the following conclusions :—

Firstly, as to Hospitals ; that, as a rule, hospitals in all countries and in all climates are under-ventilated ; that lung-and-skin-tainted air is the most deadly enemy the sick have to endure ; and that two and three storied hospitals never are sufficiently ventilated.

Secondly, sewers, drains, and water-closets should never be beneath the basement or within the wards of any hospital, but should be external, and independently ventilated.

Thirdly, that cleansing within and without hospital wards should be immediate, rigid, and at short intervals, ventilation being by windows opening up to the ceiling, or by ridge-louvre ventilation for

single-story wards. Some of the finest hospitals in Europe, in plan and in cubic space, are sadly neglected in their sanitary arrangements. It should therefore never be forgotten, that unceasing care and cleansing will be requisite to preserve the best arranged hospitals in a wholesome condition.

Fourthly, that the ground-floor of any hospital-ward should be raised from the ground to admit of full and free ventilation beneath; and that the entire site should have a layer of concrete not less in thickness than six inches.

Fifthly, that for camps, either in peace or in war, scavenging should be thorough and unceasing, so long as the ground is occupied; and that all refuse which can be burned should be so destroyed.

Sixthly, that food, water, and clothing should be wholesome and sufficient, as fever is ever the scourge of men in masses, living in the midst of accumulated filth, under-fed, and defectively clothed.

Seventhly, an army should have a full sanitary staff at command, and the Commander-in-Chief should be under the instructions issued to the Army Sanitary Commission of 1855, and have similar authority to order, to see executed, and to pay for the work done. The extravagance of war is enormous, but the cost of the fullest and most effective sanitary arrangements will only be fractional.

Eighthly, each man should have shoes of the best make which he can wear without being made a

cripple after the first day's or week's marching, if even they cost three times the price of contract boots and shoes, as a crippled soldier is an encumbrance. If a regiment has ten men lamed by bad or misfitting boots or shoes, as each man is valued at £100, a capital sum, equal to £1,000 sterling, is, for the time, lost to the service.

Ninthly, the issue of spirits as a ration has been an unmitigated evil and should be discontinued. Men wet, exhausted, and miserable, will drink spirits in excess if available; and during war, and under such conditions as prevailed in the Crimea during the winter of 1854-55, the spirit ration was sent in excess, and tended to destroy those who consumed it. Many of the men were too sick to take it. Some were dead for whom the ration was sent; and the living, to soften their misery, drank to excess as opportunity served.

APPENDIX No. I.

ON the 10th of June, Sunday morning, I was riding with some officers of the Royal Artillery who were going to their duties in one of the batteries, and, in a ravine termed "the Valley of the Shadow of Death," I was struck down by a 42 lb. round shot, and was carried to a temporary hospital in the Light Division. Lord Raglan came up to see me as soon as he heard of it, and on the Wednesday following sent his carriage to take me down to Balaklava. From thence I wrote to him, stating that the Doctor had recommended me to go home at once. The letter as under is his Lordship's reply :—

"BEFORE SEBASTOPOL, *June 22nd*, 1855.

"SIR,—I have received your letter of the 20th instant, and regret to learn that you continue to suffer from your wound, and that it is considered necessary that you should return to England without delay. This being the case, you are quite right to take advantage of the first opportunity to leave this country.

"You will take my best wishes with you, and I beg to be permitted to express my hope that you will experience no permanent bad effects from what befell you in the ravine leading to the trenches.

"It is a mercy that your life has been preserved. Few have had such an encounter with a 68 lb. shot and have escaped so well. I hope you will take the shot home with you.

"I have the honour to be, Sir,

"Your very faithful servant,

(Signed)

"RAGLAN."

"ROBERT RAWLINSON, Esq."

The shed-hospital I was placed in was at the extreme front. A hospital orderly was appointed to attend upon me, which he did with the greatest care. But at midnight he was seized with cholera in its most violent form, and died at ten o'clock the next morning. At about two o'clock in the same morning the officer I was with when wounded came to me direct from the batteries, and, seeing the condition I was in, had me, with my bed, carried to his tent, where I stayed up to the Wednesday following. His servant, in the mean time, who said he knew where the shot was which had struck me, as he got hold of it and it burned his fingers, went down and brought it up from where it had buried itself in the side of the ravine, and placed it on the floor of the tent (the Russians were firing 68-lb. shot that day, and it was assumed this was that weight). I wrote to Lord Raglan, as he had requested me to do, to say I wished to move down to Balaklava, when he at once sent his carriage up with one of his aides-de-camp, who, seeing the shot on the tent-floor, named it to his Lordship: hence his notice of it, and the mistake as to its weight. The shot is of steel, forged, not cast. When taken down to Balaklava and seen by an Ordnance officer he detected this at once, and said it was new to him, as it was the first shot of "swaged" steel he had ever seen. I have it at home now. The shot crossed in front, cutting the reins, the pomel of the saddle, and driving a steel purse on to the crest of the pelvis, making a large flesh-wound, and seriously bruising the bone. I had that moment raised my hat, to wish the officers good morning, saying I was going back, or my right arm must have been taken off, as the shot perforated my coat beneath the arm. The pelvis-bone exfoliated for months after my return, until the eminent surgeon, Mr. Ferguson, scraped away all the injured parts, when the wound healed, leaving, however, a deep hole in the place.

APPENDIX No. II.

*Extract from the "SURGEON'S DAUGHTER."
Waverley Novels, XLVIII.*

A NOVEL is not, perhaps, the best source from which to extract grave facts descriptive of Army Hospital mismanagement during the last century, but we have other records, not so graphic, but equally revolting and painful. It is also admitted that most of the incidents in the *Waverley Novels* are historical, and this description of the state of this military hospital is not one whit more terrible than the dry details of the state of the prisons of the period, as related by John Howard :—

“ The effect of the liquor displayed itself, as usual, in a hundred wild dreams of parched deserts, and of serpents whose bite inflicted the most intolerable thirst, of the suffering of the Indian on the death-stake, and the torments of the infernal regions themselves ; when at length he awakened, and it appeared that the latter vision was in fact realised. The sounds which had at first influenced his dreams, and at length broken his slumbers, were of the most horrible as well as the most melaucholy description. They came from the ranges of pallet-beds, which were closely packed together in a species of military hospital, where a burning fever was the prevalent complaint. Many of the patients were under the influence of a high delirium, during which they shouted, shrieked, laughed, blasphemed, and uttered the most horrible imprecations. Others, sensible of their condition, bewailed it with low groans and some attempts at devotion which showed their ignorance of the principles, and even the forms, of religion. Those who were convalescent talked ribaldry in a loud tone, or whispered to each other in cant language, upon schemes which, as far as a passing phrase

could be understood by a novice, had relation to violent and criminal exploits.

“Richard Middlemas’s astonishment was equal to his horror. He had but one advantage over the poor wretches with whom he was classed, and it was in enjoying the luxury of a pallet to himself,—most of the others being occupied by two unhappy beings. He saw no one who appeared to attend to the wants or to heed the complaints of the wretches around him, or to whom he could offer any appeal against his present situation. He looked for his clothes that he might arise and extricate himself from this den of horrors; but his clothes were nowhere to be seen, nor did he see his portmanteau or sea-chest. It was much to be apprehended he would never see them more.

“Then, but too late, he remembered the insinuations which had passed current respecting his friend, the Captain, who was supposed to have been discharged by Mr. Lawford, on account of some breach of trust in the Town Clerk’s service. But that he should have trepanned the friend who had reposed his whole confidence in him; that he should have plundered him of his fortune, and placed him in this house of pestilence, with the hope that death might stifle his tongue, were iniquities not to have been anticipated, even if the worst of these reports were true.

“But Middlemas resolved not to be awanting to himself. This place must be visited by some officer, military or medical, to whom he would make an appeal, and alarm his fears at least, if he could not awaken his conscience. While he resolved these distracting thoughts, tormented at the same time by a burning thirst which he had no means of satisfying, he endeavoured to discover if, among those stretched upon the pallets nearest him, he could not discern some one likely to enter into conversation with him, and give him some information about the nature and customs of this horrid place. But the bed nearest him was occupied by two fellows who, although to judge from their gaunt cheeks, hollow eyes, and ghastly looks, they were apparently recovering from the disease, and just rescued from the jaws of death, were deeply engaged in endeavouring to cheat each other of a few halfpence at a game of cribbage, mixing the terms of the game with oaths, not loud, but deep; each turn of luck being hailed by the winner as well as the loser with execrations

which seemed designed to blight both body and soul, now used as the language of triumph, and now as reproaches against fortune.

"Next to the gamblers was a pallet, occupied indeed by two bodies, but only one of which was living, the other sufferer had been recently relieved from his agony.

" 'He is dead ! he is dead ! ' said the wretched survivor.

" 'Then do you die too, and be d——d,' answered one of the players, 'and then there will be a pair of you, as Pugg says.'

" 'I tell you he is growing stiff and cold,' said the poor wretch ; 'the dead is no bedfellow for the living. For God's sake, help to rid me of the corpse.'

" 'Ay, and get the credit of having done him,—as may be the case with yourself, friend,—for he had some two or three hoggs about him.'

" 'You know you took the last rap from his breeches-pocket not an hour ago,' expostulated the poor convalescent. 'But help me to take the body out of the bed, and I will not tell the jigger-dubber that you have been beforehand with him.'

" 'You tell the jigger-dubber ! ' answered the cribbage-player. 'Such another word, and I will twist your head round till your eyes look at the drummer's handwriting on your back. Hold your peace, and don't bother our game with your gammon, or I will make you as mute as your bedfellow.'

"The unhappy wretch, exhausted, sank back beside his hideous companion, and the usual jargon of the game, interlarded with execrations, went on as before."

APPENDIX No. III.

List of Official Reports referred to in this Paper.

THE extent to which the work of the Army Sanitary Commission has extended, directly and indirectly, may be partially gathered by a glance at the list of official inquiries, reports, and publications appended, bearing on the questions of barrack and hospital improvement, hospital nursing, and ambulance arrangements. Every European army has been more or less influenced by the improved results obtained in the British army, as revealed in these reports. When the sickness and death-rates came to be critically examined, it was found that improvements tending to great reductions must take place, especially in British India, or its occupation must be given up. A mortality amongst soldiers, ranging as high as 69 in the 1,000 per annum, could not be endured, and it was confidently anticipated that this mortality could be reduced to, or even below, 20 in the 1,000. Professor de Chaumont, in a paper recently read at the United Service Museum, has shown that there has been, and now is, a reduced death-rate in every branch of the Service; though further improvements require to be made, both in barracks and in hospitals, which will effect a further saving of life when carried out,—the great retarding influence being in the Estimates.

I am aware that there is a large amount of printed matter relative to Military Hygiene,—as, for instance, a volume by Dr. Pringle, the volume by Dr. Parkes, The Soldier's Pocket Book, by Lord Wolseley; and, besides, General Orders, Barrack and Hospital Regulations; to which may be added a mass of Blue-Book inquiries as to Army Regulations both at home and abroad, the following being an imperfect list :—

No.	Date.	Name of Report.
1	1854-55	Report on British Army Hospitals in the Crimea and Scutari. By ALEXANDER CUMMING, Esq., M.D. THOMAS SPENCE, Esq., M.D. P. B. MAXWELL, Esq. Ordered by the DUKE OF NEWCASTLE.
2	1854-55	Report on Inquiry into Supplies of the British Army in the Crimea. Sir JOHN MCNEILL, G.C.B., and Colonel TULLOCH. Ordered by Lord PANMURE.
3	1855-56	Report by Army Sanitary Commission on Work done at the Hospitals on the Bosphorus, and at the Camp in the Crimea. JOHN SUTHERLAND, Esq., M.D. HECTOR GAVIN, Esq., M.D. ROBERT RAWLINSON, Esq., Civil Engineer. GAVIN MILROY, Esq., M.D. Ordered by Lord PANMURE.
4	1857	Report on Regulations affecting the Sanitary Condition of the Army. Right Hon. SIDNEY HERBERT.

No.	Date.	Name of Report.
5	1863	Report on the Sanitary Condition of Barracks and Hospitals, with Suggestions for Improvements. JOHN SUTHERLAND, Esq., M.D. W. H. BURRELL, Esq. Capt. DOUGLAS GALTON, R.E. The Right Hon. Lord HERBERT, Secretary of State for War.
6	1863	Report of Royal Commission on the Sanitary State of the Army in India. Vols. I. and II. STANLEY. PROBY T. CAUTLEY. J. R. MARTIN. J. B. GIBSON. E. H. GREATHEAD. W. FARR. JOHN SUTHERLAND.
7	1863-64	Report on Barrack and Hospitals on the Mediterranean Stations, with Suggestions for Indian Stations. Capt. DOUGLAS GALTON, R.E., F.R.S. JOHN SUTHERLAND, Esq., M.D. The Right Hon. Sir GEORGE CORNEWALL LEWIS, Bart., M.P., Secretary of State for War.
8	1869-70	Report on Measures for Sanitary Improvements in India.
9	1871	Report on Sanitary Appliances Introduced into Barracks. T. A. L. MURRAY, Deputy Director of Works. JOHN SUTHERLAND, Esq., M.D.

No.	Date.	Name of Report.
10	1863	Report of a Committee appointed by the Secretary of State for War to inquire into the Organisation of the Army Hospital Corps, Hospital Management, and Nursing in the Field, and the Sea Transport of Sick and Wounded; Together with Minutes of Evidence. Appendix and Index. Signed— MORLEY. W. R. MENDES, Admiral. R. B. HAWLEY, Major-General. R. LOYD-LINDSAY. REDVERS BUTLER, Colonel. WILLIAM MACCORMAC. T. CRAWFORD, D.G. G. LAWSON. Dissent by— R. B. HAWLEY, Major-General. R. LOYD-LINDSAY. Remarks by— WILLIAM MACCORMAC.
11	1858	Notes on Matters affecting the Health, Efficiency, and Hospital Administration of the British Army. Founded chiefly on the Experience of the late War. By FLORENCE NIGHTINGALE. Presented by request to the Secretary of State for War.
12	1815	The General Orders of Field Marshal the DUKE OF WELLINGTON, &c., &c., &c., in Portugal, Spain, and France, 1809 to 1814; and The Low Countries and France, 1815. By Lieut.-Col. JOHN GURWOOD.

No.	Date.	Name of Report.
13	1882	The Soldier's Pocket Book. For Field Service. By Lieut.-General Sir GARNET I. WOLSELEY, G.C.B., G.C.M.G. (now Lord Wolseley). Fourth Edition, revised and enlarged, with illustrations.
14	1878	Parkes's Practical Hygiene. DE CHAUMONT. Fifth Edition.
15	1866	History of the United States Sanitary Commission ; being the General Report of its Work during the War of the Rebellion. By CHARLES J. STILLÉ. Twenty-three gentlemen, with the Rev. H. W. Bellows, D.D., of New York, at the head, constituted the American Sanitary Commission.
16	1880	The Invasion of the Crimea ; its Origin, and an Account of its Progress down to the Death of Lord Raglan. By A. W. KINGLAKE. Vol. 6.

No.	Date.	Name of Report.
17	1882	Suggestions in regard to Sanitary Works and Measures required for Improving Indian Stations and their Vicinity. Prepared and revised by the Army Sanitary Commission. <i>President :</i> HERBERT, Gen. Sir A. J., K.C.B. <i>Members :</i> DAWSON SCOTT, Col. R. M. MARSTON, Dep. Surg.-Gen. J. A., M.D. YULE, Hon. Col. H., C.B. } FAYRER, Surg.-Gen. Sir J., } On behalf of K.C.S.I., M.D., Q.H.P. } India. SUTHERLAND, J., Esq., M.D. GALTON, D., Esq., C.B., late Captain Royal Engineers. RAWLINSON, R., Esq., C.B., C.E.
18	1883	The Sanitary Contrasts of the British and French Armies during the Crimean War. By Surgeon - General T. LONGMORE, C.B., Q.H.S., F.R.C.S. &c., &c., &c.

